

Grass weed management in pasture

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RESEARCH

Farming Systems

Searching for answers



Location
Minnipa Agricultural Centre,
paddock S3S

Rainfall
Av. Annual: 325 mm
Av. GSR: 241 mm
2017 Total: 281 mm
2017 GSR: 155 mm

Yield
Potential: 5.6 t DM/ha (pasture)
Actual: 1.1 t DM/ha (October)

Trial History
2017: Regenerated medic pasture
2016: Mace wheat
2015: Mace wheat
2014: Regenerated medic pasture

Soil Type
Red loam

Plot Size
10 m x 2 m x 3 reps

Key messages

- **Hay cutting in 2013 resulted in lower medic dry matter in 2017.**
- **Grass weed numbers were very low in 2017 due to low opening rains and poor germination.**
- **Two years of wheat increased Rhizoctonia, Yellow leaf spot and *Pratylenchus*.**
- **A two year pasture break was beneficial to the following cereal because of lower grass weed numbers, higher soil reserves of N and lower disease levels.**

Why do the trial?

The GRDC project 'Maintaining profitable farming systems with retained stubble - upper Eyre Peninsula' aims to produce sustainable management guidelines to control pests, weeds

and diseases while retaining stubble to maintain or improve soil health, and reduce exposure to wind erosion. The major outcome to be achieved is increased knowledge and skills allowing farmers and advisers to improve farm profitability while retaining stubble in farming systems on upper Eyre Peninsula (EP).

The Minnipa Agricultural Centre S3S pasture trial was established in 2013 to assess the impact of a two year medic pasture break on barley grass. The trial had different grass weed management and tillage treatments imposed in 2013 and 2014. The trials were sown with wheat in 2015 and 2016, and allowed to regenerate with medic pasture in 2017.

How was it done?

The replicated trial was established in 2013 at Minnipa Agricultural Centre in paddock S3S. Pasture treatments imposed in 2013 were:

- i. selective grass control,
- ii. selective grass control and mowing/haycut,
- iii. selective grass control and pasture topping.

In 2014 on 1 March the 3 blocks established in 2013 (i – iii) were each split into:

- a. worked (a light tillage with an off-set disc),
- b. unworked.

In 2015 pre-sowing treatments within each of the 6 blocks from 2014 were:

1. harrowing to remove medic stubble,
2. disc/light tillage,
3. full cut tillage,
4. direct drill.

See previous Eyre Peninsula Farming Systems Summaries for details of the treatments imposed in previous seasons. Measurements taken during the 2017 season were soil moisture, soil-borne disease inoculum, emergence counts, medic dry matter and grass weed counts (pre-seeding, at establishment and at harvest).

Data were analysed using Analysis of Variance in GENSTAT version 18.

What happened?

The red loam has an alkaline pH (8.4 in CaCl₂), with P reserves of 18 mg/kg in 0-10 cm (Colwell P), and P buffering index of 149.

In autumn of 2017, after two cereal crops, Predicta B soil analysis measured a high risk of Rhizoctonia disease (120 pg DNA/g soil), Yellow leaf spot inoculum was also high and *Pratylenchus neglectus* levels were medium risk (15 nematodes/g soil). The average wheat stubble load on the trial at the beginning of 2017 was 6.0 t/ha DM and was not affected by previous treatments.

The 2017 season was a decile 1 at Minnipa with very poor opening rains. Some medic germinated after 6 mm of rainfall on 30 May, however these plants were very small and stressed until late June/early July when a total of 21 mm of rain fell. Medic production in 2017 was very poor as the dry seasonal conditions severely limited plant growth. There were no differences between treatments in early 2017 soil moistures (March) with the average volumetric soil moisture being 123 mm (0-100 cm) with most below 30 cm.

Table 1. Dry matter production of medic in 2017 as affected by previous medic pasture management and tillage.

2013 treatment	2017 medic DM (t/ha)	2015 tillage treatment	2017 medic DM (t/ha)	
			2014 un-worked	2014 worked
Selective grass only	1.30	Disc	1.19	1.28
		Full cut	1.56	1.00
		Harrow	1.31	1.29
		Direct Drill	1.27	1.48
Selective grass + Mowing/haycut	0.92	Disc	1.19	0.75
		Full cut	0.82	0.91
		Harrow	1.17	0.94
		Direct Drill	0.87	0.72
Selective grass + Pasture topped	1.17	Disc	0.84	1.41
		Full cut	0.87	0.82
		Harrow	1.73	1.25
		Direct Drill	1.24	1.20
<i>LSD (P=0.05) 2013 treatments</i>	<i>0.2</i>	<i>LSD (P=0.05)</i>	<i>ns</i>	

Tillage treatments imposed following the pastures of 2013 and 2014 had no effect on regenerating medic dry matter production in 2017. However, hay cutting in 2013, possibly in combination with the very poor season in 2017, resulted in lower dry matter production compared to herbicide only treatments from 2013 (Table 1). In 2013 after the hay cut, medic pod yield was only half that of the herbicide only treatments, and although dry matter production improved in June 2014, the medic pod production was still half at the start of the 2015 season, which was then followed by two cereal crops.

There were very few grass weeds in 2017 with no differences between treatments. There were no differences between treatments in late 2017 soil moistures.

What does this mean?

Medic dry matter production in the very poor 2017 season was lower due to hay cutting in 2013. In 2013 after the hay cut, medic pod yield was half of the herbicide treatments imposed in the same season, and despite improved dry matter production in 2014, medic pod production was still

half at the start of the 2015 season. This rotation was followed by two cereal crops which would not have allowed the medic seed bank to regenerate and improve, therefore the effect has been carried through for four seasons.

Grass weed numbers were very low in 2017 due to low opening rains and poor germination, and no differences between treatments were detected this season. In 2014 a light tillage with an off-set disc in the medic pasture resulted in higher germination of both grass and broadleaved weeds in 2015. In 2016 the selective grass control and worked treatment from 2014 showed slightly higher grass weed numbers than hay cut or pasture topping, regardless of the 2015 tillage system. The grass weed numbers were highest in the second year medic pasture, with low barley grass and rye grass numbers in the first and second year wheat crop, and low numbers and no differences between treatments in the 2017 medic pasture.

Overall the effect of the two year pasture break was more beneficial in the first year cereal after pasture, with low grass weed numbers

and low disease levels. The high nitrogen levels fixed by the medic pasture were adequate for two cereal crops, but located deeper in the soil profile by the second season. The impact of pasture management and pre-seeding tillage on grain yield and quality was greater in the season directly after the medic pasture than in the second year.

After two years of wheat, disease levels of *Rhizoctonia*, Yellow leaf spot and *Pratylenchus* risk had increased, which supports previous research showing the disease benefits of including break crops in the rotation.

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Registered products: see chemical trademark list.

