

Long term disease suppression at Streaky Bay

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RESEARCH

Searching for answers



Location: Streaky Bay
K and D Williams
Streaky Bay Ag Bureau

Rainfall

Av. Annual: 298 mm
Av. GSR: 243 mm
2011 Total: 373 mm
2011 GSR: 238 mm

Yield

Potential: 2.6 t/ha (W) 1.9t/ha (C)
Actual: 0.8-1.8 t/ha (W), 1.1-1.6 (C)

Paddock History

See table 1

Soil

Highly calcareous grey loamy sand

Plot Size

60 m x 1.48 m x 4 reps

Other Factors

Disease

Take all and Rhizoctonia

Livestock

Trial has not been grazed since established in 2004

Economic

Cost of adoption risk: No income from livestock enterprise

Why do the trial?

A long term trial was established at Streaky Bay in 2004 to determine if disease suppression against Rhizoctonia is achievable in an upper EP environment on a grey highly calcareous soil using different rotations and cropping inputs. It also assessed whether soil microbial populations can be influenced by rotation and fertiliser inputs in this environment.

How was it done?

This trial was established in 2004 with the fertiliser treatments and rotations listed in Table 1. In 2011 the trial was in the rotation phase (Table 1). The trial was sown on 6 May. The trial received 1.5 L/ha each of Roundup PowerMAX® and Treflan® pre-seeding, 100 ml/ha Hammer® and 300 ml/ha Li700®. On 21 June the trial received 30 ml/ha Karate Zeon® for diamond back moth control. Post sowing the wheat and canola plots received 700 ml/ha Intervix® and the medic plots received Leopard® at 300 ml/ha.

What happened?

At the beginning of 2010 Take-all inoculum was a medium risk in the Intensive Cereal District Practice rotation and Take-all symptoms developed in that season. Inoculum levels are likely to have increased with the wet spring in that year.

The trial was in the rotation phase in 2011 with wheat, canola and medic plots.

The establishment of all crops was fine with the best medic pasture establishment achieved to date. Earlier in the season the canola in the high input systems looked better than the district practice.

Some Rhizoctonia patches were visible in the cereal plots and the district practice treatments were not as even as the continuous cereal high input fluid system. Severe Take-all developed in spring with white heads appearing in all intensive cereal plots but the district practice was more severely affected and this was reflected in yields achieved (Table 2).

What does this mean?

In 2010 the Take-all levels were medium in the continuous cereal district practice treatment indicating the higher nutrition treatments gives the plants the ability to cope better with increased disease levels, and this occurred again in 2011 with less disease and higher yields achieved in the high input cereal system.

The microbial respiration in 2010 and the catabolic diversity measurements of 2009, show changing rotation and nutrition have changed the microbial population activity and diversity, but disease suppression did not develop. **When disease suppression develops, it should reduce both Rhizoctonia and Take-all. Since severe Take-all was present in the trial in both of the last two seasons, this indicates disease suppression has not developed in any treatments after 8 years.**

In both the cereal and brassica system higher yields were achieved in the high input fertiliser systems compared to district practice indicating nutrition is limiting production in this environment.

Key messages

- **Disease suppression has not developed in this soil type after 8 years.**
- **Higher nutrition treatments allowed crops to cope better with high disease levels in both 2010 and 2011.**
- **Canola will reduce Rhizoctonia inoculum but only one year of wheat will result in high levels of Rhizoctonia inoculum again.**
- **In good seasons the high input treatments have shown that district practice performance is limited by poor nutrition.**

Table 1 Rotations and treatments used in the Long Term Disease Suppression trial

Rotation	Fertiliser each season (kg/ha)	Crops/pastures and seeding rates (/ha)							
		2004	2005	2006	2007	2008	2009	2010	2011
District Practice	14 P and 16 N applied as DAP	Excalibur wheat @ 55 kg	Keel barley @ 60 kg	Angel medic @ 5 Kg	Clearfield Stiletto wheat @ 60 kg	Herald medic @ 5 kg	Wyalkatchem wheat @ 60 kg	Hindmarsh barley @ 60 kg	Caliph medic @ 5 kg
Intensive Cereal - District Practice Inputs	16 P and 7 N applied as MAP	Excalibur wheat @ 55 kg	Keel barley @ 60 kg	Ticket triticale @ 60 kg	Clearfield Stiletto wheat @ 60 kg	Clearfield Janz wheat @ 60 kg	Wyalkatchem wheat @ 60 kg	Hindmarsh barley @ 60 kg	Clearfield Kord wheat @ 60 kg
Intensive Cereal - High Inputs as fluids	20 P applied as APP, 18 N as UAN and TE (Zn, Mn, Cu)	Excalibur wheat @ 55 kg	Keel barley @ 60 kg	Ticket triticale @ 60 kg	Clearfield Stiletto wheat @ 60 kg	Clearfield Janz wheat @ 60 kg	Wyalkatchem wheat @ 60 kg	Hindmarsh barley @ 60 kg	Clearfield Kord wheat @ 60 kg
Brassica Break - District Practice Inputs	16 P applied as MAP	Rivette canola @ 5 kg	Keel barley @ 60 kg	Stubby canola @ 5 kg	Clearfield Stiletto wheat @ 60 kg	44C73 canola @ 5 kg	Wyalkatchem wheat @ 60 kg	Hindmarsh barley @ 60 kg	44C80 canola @ 5 kg
Brassica Break - High Inputs as Fluids	20 P applied as APP, 18 N as UAN and TE (Zn, Mn, Cu)	Rivette canola @ 5 kg	Keel barley @ 60 kg	Stubby canola @ 5 kg	Clearfield Stiletto wheat @ 60 kg	44C73 canola @ 5 kg	Wyalkatchem wheat @ 60 kg	Hindmarsh barley @ 60 kg	44C80 canola @ 5 kg

Table 2 Yield and quality data collected from the Long Term Disease Suppression trial, 2011

Rotation	2011 Yield (t/ha)	Protein (%)	Screenings (%)	Test wt (g/hL)
Intensive Cereal District Practice Inputs	0.81	12.8	11.5	384
Intensive Cereal High Inputs	1.79	12.5	13.3	387
Brassica Break District Practice Inputs	1.14	-	-	-
Brassica Break High Inputs	1.59	-	-	-
LSD (P=0.05)	0.14			

This trial will not be continued because we believe that we have little further to learn from the treatments present.

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Roundup PowerMAX - registered trademark of Monsanto, Treflan - registered trademark of Dow Agrosciences, Hammer - registered trademark of Crop Care, Li 700 - registered product of Nufarm Karate Zeon - registered

trademark of Syngenta, Intervix - registered trademark of Crop Care, Leopard - registered product of FarmOz.