Cereal Crop Competition vs Ryegrass

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Location: Wanilla
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Rainfall
Av. Annual: 490 mm
Av. GSR: 396 mm
2009 Total: 511 mm
2009 GSR: 383 mm

Yield
Potential: 5.4 t/ha (W)
Actual: 4.1 t/ha (W)

Paddock History
2008: Canola
2007: Lupins
2006: Wheat

Soil Type
Buckshot loam over sodic clay

Plot size
10 m x 1.5 m x 4 reps

Yield Limiting Factors
Waterlogging, nitrogen deficiency and ryegrass competition

Key messages

- **Ryegrass is a "pussy" in dry seasons, but a "panther" in wet seasons!**
- **Crop competition does not suppress ryegrass when the soil remains waterlogged.**

Why do the trial?

Annual ryegrass is a weed of concern for growers on all regions across Eyre Peninsula. However it is on lower Eyre Peninsula where the weed is most threatening current farming systems. The trial aimed to compare four locally grown wheat varieties at district practice and high seeding rates to assess their influence on reducing the impact of ryegrass in the whole farming system.

This article follows on from work reported in EPFS Summary 2006, p 182-183 and 2008, p 58-60.

How was it done?

The trial was sown on a paddock with a history of ryegrass at Wanilla on 15 May. Four varieties of wheat; Wyalkatchem, Gladius, Espada and Correll were each sown at 180, 300 and 450 plants/m^2. The trial was sown using Cummins Landmark's DBS plot seeder on 30 cm row spacing.

The trial received a knockdown spray and 1.5 L/ha Trifluralin + 1.6 L/ha Avadex Xtra pre sowing.

What happened?

The wheat emerged well and was quite vigorous when the first assessments were made in mid June. Seasonal conditions had been wet enough in June to allow ryegrass to germinate on the soil surface. An average of 251 plants/m^2 of ryegrass had established across the site. Throughout July and August the wheat was being suppressed by waterlogging, allowing the ryegrass to dominate the wheat. During this time 80 kg/ha urea was broadcast and 30 L/ha UAN sprayed to try and improve the N supply and the wheat competition.

In September the ryegrass had grown above the crop canopy to the point where there seemed little chance of continuing the trial due to potential ryegrass seed set. The grower decided to crop-top the paddock with glyphosate to reduce the contribution of 2009 seed to the ryegrass seed bank.

Due to the paddock being crop-topped with glyphosate, there was no opportunity to assess ryegrass seed set with actual viable seed. Instead samples of ryegrass were collected on 20 October. Potential seed set was assessed by counting the number of spikes (seed heads) per quadrat, then individually counting how many spikelets and seeds per spikelet were on 30 spikelets per plot.

The resulting potential seed set ranged from 177,000 to 277,000 seeds/m^2. This is in the order of ten fold of what has been experienced by University of Adelaide weeds research staff.

Crop competition or variety choice had no impact on ryegrass emergence, spike number and final seed set. Increased sowing rates did lead to higher grain yield, however. Wyalkatchem yielded the most in the presence of immense weed pressure. Wyalkatchem yielded as well at the low seeding rate as any other variety at even the higher sowing rates (Table 1).

Table 1 Grain yield at Wanilla with variety and sowing rates, 2009

Variety	180 plants/m²	300 plants/m²	450 plants/m²
Correll	2.31	2.89	3.13
Espada	1.74	2.57	2.66
Gladius	1.94	2.31	2.94
Wyalkatchem	3.35	3.68	4.16
LSD (P=0.05)	*0.81*	*0.81*	*0.81*

What does this mean?

It is very disturbing to see such a substantial blow out of ryegrass numbers after such a good pre-sowing herbicide combination. Growers on lower Eyre Peninsula report that even the most expensive pre-sowing herbicides "run out of puff" on acidic waterlogging soils well before they do on more neutral pH freely draining soils.

The massive ryegrass seed set may be a one off combination of events, however it is still a staggering seed set. If only half the potential seed set was viable, that is still around four fold the seed set of what has been documented elsewhere. If an aggressive program of weed control manages to control 95% of 177,000 seeds/m² (which may take up to three years of total seed set control), the grower is still left with 8,850 seeds/m² to deal with.

Previous research in the 2006-2009 period indicated that wheat can be competitive with ryegrass, especially in dry seasons. The sharp finishes of the 2006 to 2008 period saw the ryegrass in some cases die rather than set seed. However, if a favourable spring occurs, the ryegrass can be extremely competitive. If the conditions are shifted in favour of ryegrass through waterlogging, then wheat has little chance of competing. Increasing seeding rates above district practice levels of 180 plants/m² can also lead to higher yielding, more competitive wheat crops.

Ryegrass in this situation should NEVER be given the opportunity to set seed. That is unless the grower would like to set up a very productive ryegrass pasture for the next five years. Cutting hay or brown manuring is the best option to make sure that it does not contribute to future weed burdens. Crop-topping is realistically only an option for moderate ryegrass infestations. Successful crop-topping in wheat for ryegrass seed set control will be compromised by late timing to avoid crop damage and to keep within label recommendations.

Roundup PowerMax is the only glyphosate formulation currently registered for crop-topping wheat. Check the crop-topping wheat article in this book and product label for further details.

The acidic waterlogging soil types on lower Eyre Peninsula have some very serious challenges ahead. Ryegrass will increasingly dominate management decisions as herbicide options become more limited. Utilising the ryegrass as a productive pasture may be an attractive option to some growers, however not all. Fundamentally weed management is a numbers game, the rotation needs to be focused on reducing ryegrass seed numbers at every opportunity. Chaff carts have not been attractive for various reasons, however we are running out of tools in the box, so we need to consider all options available to us. Hopefully the long awaited Western Australian Harrington Seed Destructor (rotomill) will be a viable option for the lower Eyre Peninsula growers to apply some non herbicidal pressure on ryegrass.

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