

Assessing growth and yield of grain cover crops in established perennial pasture species

Dave Gartner & Hellene McTaggart, West Midlands Group

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Purpose:	The aim of the demonstration is to assess the growth and yield of barley and wheat growing in a range of different established perennial pasture species.
Location:	Badgingarra Research Station
Soil Type:	Pale deep sand
Rotation:	Long-term perennial pasture (mixed species)
GSR:	482mm

Table 1 Soil Test Results:

Element		0-10cm	10-20cm	1-30cm
Nitrate N	mg/kg	5		
Ammonium N	mg/kg	5		
P	mg/kg	16	10	19
K	mg/kg	30	20	12
S	mg/kg	14	4	2
OC	%	1.44		
Cu	mg/kg	0.68		
Zn	mg/kg	2.47		
PBI		5		
EC	dS/m	0.05	0.02	0.01
pH	(CaCl ₂)	5.6	4.7	4.6
Al	mg/kg	0	1.8	3.4
Gravel	%	0	0	0

BACKGROUND

Farmers are keen to test the flexibility and potential of perennial pasture systems. In particular, there has been interest in the concept of 'Pasture Cropping' among farmers in the West Midlands and wider Northern Agricultural Region. This project is a preliminary investigation driven by farmer demand for information in this new practice.

The plot demonstration contains 16 plots of established perennial pasture species (established in approx 2005). At the time these perennial pasture plots were established the perennial system was still in its infancy in WA. The pastures species present at the site are: kikuya, panic, rhodes grass, lucerne and couch grass.

The perennial pasture plots were sown at the break of the season with a cone disc seeding machine. The aim of the demonstration is to assess the growth and yield of barley as a cover crop in different established perennial pasture species.

DEMONSTRATION DESIGN

Plot size: 9.8 m in length

Repetitions: 2 x kikuya; 5 x panic; 4 x rhodes; 3 x lucerne; 2 x couch grass

Crop details: Calingiri wheat @ 75kg/ha and Baudin barley @ 75 kg/ha on 31 May

Fertiliser: **At seeding:** MAPSZC @ 75 kg/ha, Potash @ 60 kg/ha

Post: Urea @ 40 kg/ha (13 July); Urea @ 40 kg/ha (2 August)

Herbicide: **Pre:** Sprayseed @ 1.5L/ha

Post: Barracuda @ 850 mL/ha, Alyy @ 4 gm/ha, Hasten @ 10mL/ha, Velocity @ 670mL/ha

RESULTS & DISCUSSION

Crop establishment

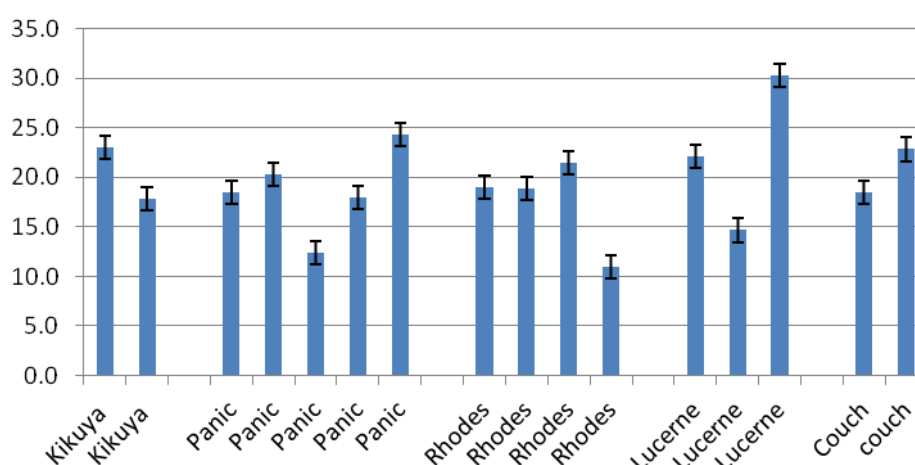


Figure 1: Wheat plant establishment counts (av. plants/m²) taken 14 June

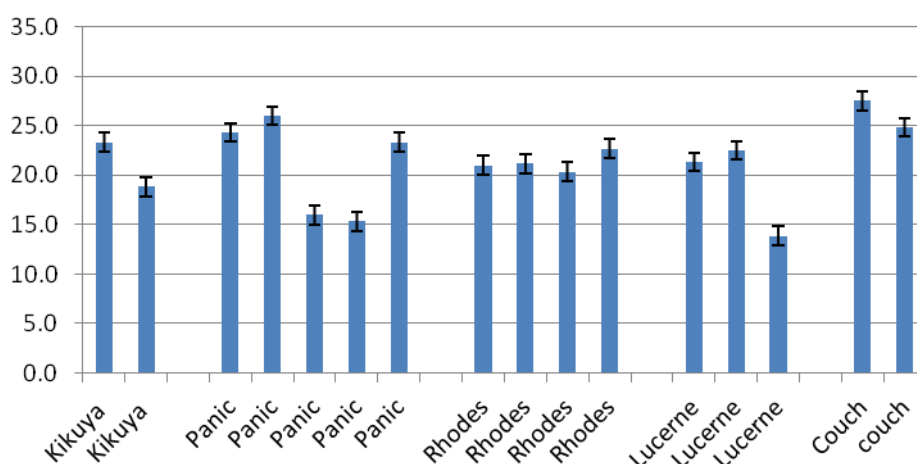


Figure 2: Barley plant establishment counts (av. plants/m²) taken 14 June

- Non wetting soil resulted in poor weed germination pre seeding
- Pre seeding the total trial area received 2 knockdowns with 1.5 L/ha Sprayseed.

- The limitation and knowledge of the relative tolerance of the different perennial grasses to grass selective herbicides prevented removal of late germinating brome and ryegrass from the trial post seeding.
- Jaguar was sprayed on the 29/6/2011 and good broad leaf control was achieved.
- The late rains in October/ November also created issues. The rapid growth of the perennials in just a few weeks saw them reach similar heights of both the barley and wheat crops, and this made harvest very difficult.

Yield

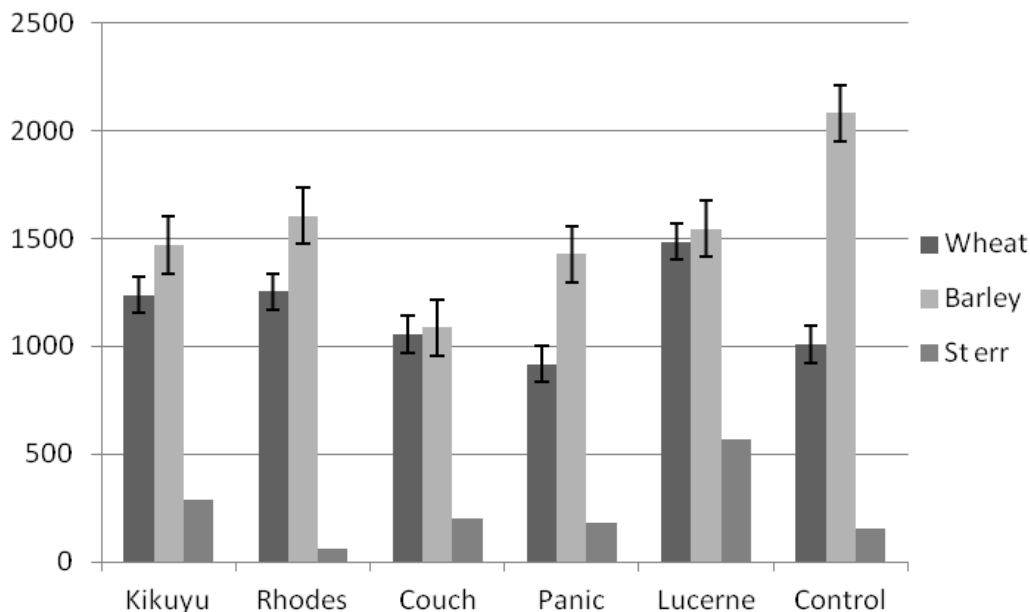


Figure 3. Grain yield (kg/ha) of wheat and barley at maturity

- Weed control was by far the most limiting factor to the results. The trial site had a very high weed burden because weed seed-set had not been controlled the previous year. In addition late germinating brome and ryegrass were not controlled in-crop for fear of damaging the perennial grasses. As with standard cropping practice, weeds should be controlled the year prior to cropping paddocks in order to minimize competition and optimize crop yields.
- Plots labelled as “control” (figure 3) where assumed to be a perennial species that previously failed to establish. These were harvested with high (but variable) density of brome and rye grass.
- The density of perennial grasses (and lucerne) was highly variable, and some plots were excluded from germination and yield measurements . This resulted in varying numbers of plots harvested for each treatment, which complicated statistical analyses.
- With late spring rainfall and the increased temperatures some of the perennial grasses grew very rapidly in October/November during grain fill of the cereals.
- Grain yield of wheat in pasture species varied from 0.9 to 1.5 t/ha, with the highest yield measured in wheat growing with Lucerne (figure 3).
- Barley yields were marginally higher, varying from 1.1 to 2.1t /ha
- Barley out yielded wheat when grown with kikuyu, rhodes and panic, whilst there was no difference in barley and wheat yields when the companion perennial was couch and lucerne.

- Pasture cropping has also been used to lift feed production in winter when perennials are dormant or to increase biomass to conserve feed in spring (hay). These end uses may have been better given the high weed burden at the site.

REVIEWED: David Ferris, DAFWA

ACKNOWLEDGEMENTS

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