# Grazing Cereals Demonstration, Gillams

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| **Purpose:** | This Demonstration forms part of the Grain & Graze II project looking at the relative merits of grazing canola and cereal crops. This demonstration looks to assess whether the effects of grazing wheat with sheep during the growing season. Factors being assessed are Yield & quality, dry matter production and grazing value. |
| **Location:** | Irwin House, Gillams, Irwin/ Mingenew |
| **Soil Type:** | Loamy sand |
| **Soil test:** | pH 5.1; OC 1.2%; $NO_3$ 10mg/kd; $NH_4$ 5mg/kg; P 13mg/ka: PBI 6; K 59mg/kg; S 8mg/kg |
| **Rotation:** | 2009 Lupins, 2006-2008 Pasture |
| **GSR**: | 291mm |

## BACKGROUND

9 farms across WA (with clusters around Geraldton, Kojonup and Esperance) will investigate the grazing of cereals and canola in winter using a paired paddock comparison (with one half grazed, the other half ungrazed). The impact of animal grazing on crop maturity, height and yield, grain quality, disease and weeds will be determined. Livestock productivity will be measured using DSE grazing days.

Linked to these activities (but not funded by Grain & Graze) are 2 small plot trials (Kojonup and East Wagin) conducted by DAFWA (with assistance from John Kirkegaard) investigating the impact that grazing has on the yield of a range of cereal and canola germplasm established at 2 times of sowing. These trials will run in 2010 and 2011.

An economist will analyse the results coming from both the paired paddock comparisons and the small plot trials. These will be analysed both at a paddock scale and at the whole farm scale to determine the economic advantages / disadvantages of grazing cereals in winter.

## TRIAL DESIGN

**Machinery:** Flexi Coil 1720bar set up on 9inch row spacing.

**Trial size:** 165 ha. Area grazed – 40 hectares.

**Crop details:** Bonnie Rock at 80kg/ha on 3rd June 2010

**Fertiliser:** **At seeding:** 100kg Agstar Extra

**Herbicide:** 1 L/ha Roundup Powermax; 1 L/ha Sprayseed; 2.5 L/ha Boxer Gold

## RESULTS & DISCUSSION

Plant counts across the trial site averaged 120 plants/m2.

***Table 1*** *Wheat grazing demonstration. Plant cuts taken 15 July just prior to animals being introduced to the wheat crop.*

| Rep | cut weight (1m2) | kg/ha |
|---|---|---|
| 1 | 66 | 660 |
| 2 | 28 | 280 |
| 3 | 42 | 420 |
| 4 | 38 | 380 |
| Average | 43.5 | 435 |

### *Grazing Value*

The crop was grazed at the 4.5 leaf stage just as the crop began to tiller. The stocking rate (34DSE/ha) was not able to keep onto of the amount of feed and hence the first grazing was uneven. The grazing area was then reduced (68DSE/ha) so the stock could graze more evenly. The sheep were removed from the crop at the Z32 stage which is slightly later than ideal. In total there was 447 DSE grazing days achieved from the paddock during the growing season (Table 2). This equates to a grazing value of $61.25/ha

***Table 2*** *Gillams Grazing days achieved during the year from the wheat paddock and calculated returns from these grazing events.*

| area | Sheep Type | Date In | Date Out | Grazing Value * | # | days | DSE Grazing Days/ha** | | |
|---|---|---|---|---|---|---|---|---|---|
| 33.5 | Lambs (55kg) | 18-Jul | 25-Jul | 1 | 1160 | 7 | 242 | $ | 33.20 |
| 17 | Lambs (55kg) | 25-Jul | 28-Jul | 1 | 1160 | 3 | 205 | $ | 28.04 |
| | | | | | | | 447 | $ | 61.25 |

*= *A grazing value of 1 equates to a full grown sheep (1 DSE)*

**= *365 DSE Grazing Days/ha = 1 DSE annual carrying capacity.*

*** = *See Appendix I for costings*

### *Plant Height at Maturity*

Plant height for ungrazed wheat was 0.9m compared to 0.82m when grazed. There were 354 heads/m2 where ungrazed compared to 302 heads/m2 where grazed. This suggests that the crop may have been grazed for too long past the Z31 stage resulting in a loss of heads.

### *Yield & Quality Data*

The average yield penalty from grazing the wheat was 337 kg/ha (11%) (Table 3). This varied significantly across the trial area. Screenings were higher where grazed however protein and screening were similar.

***Table 3*** *Grain yield and quality measurements from grazed and ungrazed treatments.*

| | Ungrazed | | | | Grazed | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | kg/ha | Protein (%) | Screen (%) | kg/hl | kg/ha | Protein (%) | Screen (%) | kg/hl | Variation (kg/ha) |
| Rep 1 | 2969.0 | 11.7 | 6 | 82.2 | 3102 | 11.5 | 8 | 81.6 | 133.0 |
| Rep 2 | 2774.0 | | | | 2373 | | | | -401.0 |
| | 3485.0 | | | | 2937.5 | | | | -547.5 |
| | 3441.0 | | | | 3137 | | | | -304.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2997.0 | | | | 2431.5 | | | | -565.5 |
| Average | 3133.2 | | | | 2796.2 | | | | -337.0 |

### *Gross Margin Calculations*

Grazing the wheat on average across the trial site resulted in an $90.99 reduction in grain income. This was offset by the grazing value of the wheat (calculated to be $61.25/ha). Taking this into account the grazed area had a reduced profit result of $29.74 compared to the ungrazed area.

***Table 4*** *Gross margin and profit calculation*

| | **Income($/ha)** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Ungrazed** | **Grazed** | **Variation ($/ha)** | **Costs ($/ha)** | **Grazing Value** | **Ungrazed Profit ($/ha)** | **Grazed Profit ($/ha)** | **Variation ($/ha)** |
| Bonnie Rock | $ 845.96 | $ 54.97 | $ (90.99) | $ 62.38 | $ 61.25 | $ 683.58 | $ 653.84 | $ (29.74) |

*Gross margin calculated on the following cost assumptions:*

- *Wheat Price- $520/t on farm*
- *Sheep Profit- $50/DSE*

## CONCLUSION

- This wheat crop provided significant grazing value, however the paddock was in late in the sowing program which reduced the ability to graze the crop early in the season. This may also have affected how well the crop recovered from grazing due to the delay in maturity of the crop.
- There was an 11% reduction in yield in this demonstration. Sheep grazed the trial past the Z31 stage which would have meant grain heads would have been vulnerable to the damage from grazing. Smaller yield reductions would have been possible if sheep were removed from the paddock a few days earlier.
- When the grazing value of the sheep was taken into account there was a $29.74 reduction in profitability from grazing the paddock.
- Grazing cereal crops allows farmers to alter their stocking rate quickly and easily as they progress through the season. This practise will mean in better seasons a much smaller proportion of paddocks will need to be left for stock and more paddocks can be taken through to harvest which will result in a significant increase in farm profitability. In poor seasons there will be less paddocks taken though to harvest will result in a reduction in grain income, higher sheep grazing losses and lower farm profitability. The overall profitability of grazing cereal crops will depend on the frequency of dry years and good years,
- Don Nairn finds that grazing cereal crops takes the stress out of running sheep as there is always an option for the farmer when feed runs short (ie he can simply graze another crop). Hopefully this trial gives farmers a better appreciation of where the dollars fall when crops are grazed.


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