

"Barley Agronomy Trials"

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Key Outcomes:

- Highest grain yields were produced at the earlier sowing date at Frances but the later sowing date at Conmurra
- Commander produced the highest grain yields at both sites with the lowest protein content
- Increased N application rates had no effect at Conmurra but a small increase in yield at Frances
- Increased sowing rates have been shown to slightly increase grain yield but reduce screenings and protein so may assist in attaining the malting grade
- Disease control was critical to allow high grain yields to be achieved

Trial Objectives: To assess the yield of a range of agronomic treatments on barley varieties at several sites

Trial Duration: 2010-11

Location: Various

Farmer Co-operators: Martin & Kirsty Flower

Soil Type: Various

Hartley Hocking

Paddock History: Various

Monthly Rainfall:

| Rain | Jan | Feb | Mar | Apr | May | June | Jl | Aug | Sep | Oct | Nov | Dec | April-Oct | Total |
|----------------|------|------|------|------|------|------|------|-------|------|------|------|-------|-----------|-------|
| Frances, 2010 | 14.4 | 40.8 | 26.8 | 60.6 | 31.6 | 57.6 | 43.8 | 119.2 | 55.4 | 29.8 | 29.2 | 92.2 | 398 | 601.4 |
| Conmurra, 2010 | 18 | 35.2 | 24.8 | 65.2 | 42 | 77.4 | 48.8 | 146.8 | 74.8 | 29.4 | 27.4 | 130.2 | 484.4 | 720 |

Yield Limiting Factors: Heavy disease pressure and lodging at Conmurra

Waterlogging in TOS2 trial at Frances

Type of Trial: Replicated Plot Trial

Trial Design: 8m Long Plots x 8 Rows at 15cm Spacings (1.2m);

3 Replicates

Treatments:

Barley agronomy trials were sown in a one and a half replicated design. Treatments included;

- Time of sowing (x2)
- Variety Treatments (x4)
- +/- Fungicide spray
- Varying Nitrogen rates (x4)
- Sowing Rate (x2)

All trials were sown with small plot equipment and managed as per usual agronomic treatment. Grain yield was determined by machine harvest. Statistically significant results are presented in tables below.

Trial Results**Table 1: Effect of variety and fungicide on yield and quality at Frances, 2010**

| Variety | Yield (kg/ha) | | 1000 grain wt (g) | | Screenings (%) | | > 2.8 mm | | Test weight | |
|------------------|---------------|-------------|-------------------|-------------|----------------|------------|-------------|-------------|-------------|-------------|
| Fungicide | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed |
| Buloke | 2236 | 2372 | 42.3 | 42.5 | 1.7 | 1.6 | 57.7 | 57.4 | 62 | 61.8 |
| Commander | 2788 | 3213 | 39 | 41.4 | 3 | 1.7 | 66.7 | 78.9 | 62.3 | 62.7 |
| Gairdner | 3143 | 3537 | 41.9 | 45.1 | 2.1 | 0.8 | 56.5 | 72.7 | 64.5 | 64.9 |
| Hindmarsh | 1875 | 1967 | 35.1 | 35.8 | 4.3 | 4 | 56.8 | 57.7 | 63.4 | 63.2 |

Table 2: Effect of Nitrogen on yield and quality in Barley at Frances

| N rate (kgN/ha) | Yield (kg/ha) | 1000 grain wt (g) | Screenings (%) | Protein (%) | > 2.8 mm | Test weight |
|-----------------|---------------|-------------------|----------------|-------------|-------------|-------------|
| 0 | 2522 | 40.8 | 2.1 | 11.2 | 68 | 62.9 |
| 25 | 2675 | 40.8 | 2.3 | 11.5 | 64.8 | 63.3 |
| 50 | 2622 | 40.1 | 2.5 | 12 | 60.8 | 63 |
| 100 | 2748 | 39.9 | 2.8 | 12.5 | 58.7 | 63.2 |

Table 3: Effect of sowing date and fungicide on yield and quality at Frances 2010

| TOS ↓ | 1000 grain wt | | | | | | | | | | Test weight |
|--------------|---------------|-------------|-----------|-------------|----------------|------------|-------------|-------------|-------------|-------------|-------------|
| | Yield (kg/ha) | | (g) | | Screenings (%) | | > 2.8 mm | | Nil | | Sprayed |
| Fungicide | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | |
| TOS 1 | 2707 | 3548 | 38.1 | 43 | 3.7 | 1.6 | 52.2 | 72.3 | 63.2 | 64.2 | |
| TOS 2 | 2314 | 1996 | 41 | 39.5 | 1.8 | 2.5 | 66.6 | 61.1 | 62.8 | 62.1 | |

Frances: Time of Sowing 1: 12th May 2010Time of Sowing 2: 2nd June 2010**Table 4: Effect of variety and sowing date on yield and quality of barley at Frances 2010**

| Variety | Yield (kg/ha) | | 1000 grain wt (g) | | Screenings (%) | | Protein (%) | | > 2.8 mm | | Test weight | |
|------------------|---------------|-------------|-------------------|-------------|----------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | TOS | TOS 1 | TOS 2 | TOS 1 | TOS 2 | TOS 1 | TOS 2 | TOS 1 | TOS 2 | TOS 1 | TOS 2 | TOS 1 |
| Buloke | 2854 | 1755 | 43 | 41.8 | 1.6 | 1.7 | 11.3 | 12.5 | 60.6 | 54.5 | 62.8 | 61 |
| Commander | 3497 | 2504 | 39.6 | 40.9 | 3.2 | 1.5 | 11.1 | 11.4 | 64.8 | 80.8 | 62.7 | 62.4 |
| Gairdner | 3937 | 2743 | 43.9 | 43.2 | 2 | 0.8 | 10.4 | 11.2 | 63.9 | 65.4 | 65.2 | 64.2 |
| Hindmarsh | 2223 | 1619 | 35.7 | 35.2 | 3.8 | 4.5 | 13.2 | 13.4 | 59.8 | 54.8 | 64.3 | 62.4 |

Table 5: Effect of Sowing rate and fungicide on yield and quality of barley at Frances 2010

| Fungicide | Yield (kg/ha) | | Screenings (%) | | > 2.8 mm | |
|-------------|---------------|-------------|----------------|------------|-------------|-----------|
| Sowing rate | 150 | 200 | 150 | 200 | 150 | 200 |
| Nil | 2359 | 2663 | 2.6 | 2.9 | 59.9 | 59 |
| Sprayed | 2755 | 2790 | 2.2 | 1.9 | 66.1 | 67.3 |

Table 6: Effect of Fungicide and Variety on Yield and Grain Quality at Conmurra 2010

| Variety | Yield (kg/ha) | | Screenings (%) | | Protein (%) | | above 2.8 mm | | Test weight | |
|------------------|---------------|-------------|----------------|------------|-------------|-------------|--------------|-------------|-------------|-------------|
| Fungicide | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed |
| Buloke | 4037 | 4377 | 3.2 | 1.4 | 12.2 | 12.4 | 58.6 | 68.2 | 62 | 61.8 |
| Commander | 4266 | 5208 | 3.5 | 1.2 | 12.4 | 12.6 | 70 | 85 | 62.3 | 62.7 |
| Gairdner | 3580 | 4778 | 9 | 4.1 | 13.5 | 13.8 | 33.1 | 58.5 | 64.5 | 64.9 |
| Hindmarsh | 4570 | 4484 | 2.8 | 0.9 | 13.8 | 13.4 | 66.9 | 80.1 | 63.4 | 63.2 |

Table 7: Effect of sowing date and fungicide on Yield and Grain Quality at Conmurra 2010

| TOS | Yield (kg/ha) | | Screenings (%) | | Protein (%) | | > 2.8 mm | | Test weight | |
|--------------|---------------|-------------|----------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Fungicide | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed | Nil | Sprayed |
| TOS 1 | 3724 | 4498 | 5.6 | 1.9 | 13 | 12.9 | 50.1 | 74.4 | 62.9 | 65.3 |
| TOS 2 | 4552 | 4925 | 3.6 | 1.9 | 12.9 | 13.2 | 64.2 | 71.5 | 64.6 | 65.1 |

Conmurra: Time of Sowing 1: 19th May 2010Time of Sowing 2: 15th June 2010**Table 8: Effect of Nitrogen Rate on Grain Quality**

| N rate (kgN/ha) | Screenings (%) | Protein (%) | > 2.8 mm | Test weight |
|-----------------|----------------|-------------|-------------|-------------|
| 0 | 2.8 | 12.8 | 68.6 | 64.9 |
| 25 | 3.4 | 12.9 | 66.4 | 64.4 |
| 50 | 3 | 13.1 | 62.3 | 64.4 |
| 100 | 3.8 | 13.3 | 62.9 | 64.3 |

Table 9: Effect of variety and fungicide on disease and lodging at Conmurra 2010

| Variety | Scald | | Leaf rust | | Lodging | |
|------------------|------------|------------|------------|-----------|------------|------------|
| Fungicide | Nil | Fungicide | Nil | Fungicide | Nil | Fungicide |
| Buloke | 2 | 0.2 | 3.4 | 0 | 6 | 5.5 |
| Commander | 5.1 | 0 | 1.7 | 0 | 6 | 4.8 |
| Gairdner | 6.9 | 0.1 | 1.4 | 0.1 | 6.6 | 5.7 |
| Hindmarsh | 3.2 | 0.1 | 1.1 | 0 | 6.8 | 7.5 |

Lodging Scale Used:

9 = Plot Vertical and upright

0 = Plot Horizontal

Disease Scores Used:

0 = no disease

9 = disease to top of canopy

Comments

Both sites were sown following canola crops in 2009. Sowing dates at Frances were 12 May and 2 June 2010. Sowing dates at Conmurra were 19 May and 15 June 2010. The second sowing at Frances was badly affected by early waterlogging soon after sowing. The early sowing at Conmurra was severely lodged and affected by disease. Both sites were affected by weather damage prior to harvest.

Highest grain yields were produced at the earlier sowing date at Frances (Table 3) but the first sowing at Conmurra resulted in lower grain yields caused by lodging and very severe

disease (Tables 7 and 9). Gairdner produced the highest grain yields at Frances regardless of disease control. Barley scald had a major effect at Frances. At Conmurra, Commander produced the highest grain yield when a fungicide was used but Hindmarsh produced a higher yield with no fungicide. At Conmurra, both scald and leaf rust affected all varieties although scald in Hindmarsh was only in hotspots (Table 9).

Increased N application rates increased grain yield slightly at Frances (Table 2) but had no effect on grain yield at Conmurra (Table 8). At both sites, increased N rate increased screenings and protein and decreased the percentage of seed over a 2.8 mm screen. The effect of increased N rate was much less than occurred at both sites in 2009. There was no significant interaction between N rate and sowing date in 2010.

Increased sowing rates have previously been shown to slightly increase grain yield but reduce screenings and protein so may assist in attaining the malting grade. While sowing rate had no effect at Conmurra, there was a significant interaction between sowing rate and fungicide at Frances (Table 5). The higher sowing rate resulted in increased yield over the low sowing rate when no fungicide was used. Protein content was reduced from 11.9% down to 11.7% as sowing rate was increased.

Conclusion and into the paddock

- Little response to applied nitrogen was noted in 2010, compared to the large responses in 2009.
- Early sowing resulted in severe disease pressure and lodging at Conmurra while delayed sowing resulted in poor yields at Frances due to early waterlogging.
- Control of diseases (Scald and leaf rust) resulted in increased grain yield and quality at both sites. Gairdner and Commander produced the highest grain yields at both sites providing disease was controlled.

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