## 3.2.4 OPTIMISING FUNGICIDE STRATEGIES FOR MALTING BARLEY CV GAIRDNER (RICCARTON, TAS)

**Abstract:**
All fungicide treatments out yielded the untreated control by between 1- 8.5% (0.1 –0.7 t/ha) as a response to moderate Scald *Rhynchosporium* infection. Strobilurin fungicide addition resulted in superior disease control relative to the triazole (Bumper 250 ml/ha) control treatments, however the increases in yield were still relatively small (1 –5% higher than Bumper control). The largest yield increase (0.7 t/ha) was associated with 2 applications of Amistar Xtra at 400ml/ha. Based on approximate costs of $80/ha for the Amistar Xtra it would have been cost effective at $135/t for feed barley, but only just (quality analysis is currently awaited).
Splitting the same active ingredient between GS31 and GS49 resulted in better disease control and yield response for the majority of treatments. The Bumper control however, gave a 3% yield increase irrespective of timing or whether it was one or two sprays, but the disease assessment during grain fill still indicated that the 2 spray option was superior.
The overall conclusion from this work was that whilst yield increases were generated from controlling Scald at a very high yield level 8-9t/ha, the yield responses were not as great as one might have expected. In these circumstances the cost of the fungicide input has to be kept relatively modest.

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**Acknowledgements:**
The authors would like to place on record their grateful thanks to the GRDC for funding this work.

**Funding Organization:** GRDC

**Location:** Riccarton, North Midlands, Tasmania

**Growing Season Rainfall (April-Dec):**
343mm plus irrigation

**Background/Objectives:**
The objectives of these trials were very similar to those pursed last season, those being to establish guidelines on the use of foliar applied fungicides in barley crops. The treatment list has been set up to examine the timing of commonly established standards such as Tilt/Bumper (propiconazole) in relation to the new strobilurin products such as Amistar Xtra (containing azoxystrobin) and Flint (trifloxystrobin).

Some of the evidence from 2003 trials (both project and non project) suggested that strobilurins such as Amistar Xtra might have greater potential for use in barley than in wheat, though this still has to be confirmed. There are a number of factors that may support these initial findings, the first is that in general, barley diseases are harder to control with existing triazole products than prevalent wheat diseases, the second is that the most important leaves in the barley canopy occur earlier in the crops development and could potentially be expected to derive benefit from a fungicide that persists for longer, as the strobilurins have been proven to do.

**Methodology:**
Gairdner barley was sown into a moist seedbed on 4$^{th}$ June 2004 at a target planting population of 200 plants/m$^2$. Scald *Rhynchosporium* was the principal disease of the trial but it developed very slowly from GS30/31 when it was apparent at very low levels. Leaf rust affected the trial late season but again was present at low levels.

Fungicides were targeted at one of 2 different timings, GS30-31 (pseudo stem erect) and GS39-49, (flag leaf emergence – 1$^{st}$ awns). The actual dates of application were 29$^{th}$ September (GS31) and the 29$^{th}$ October (GS49). The treatments are listed in Table 1.

**Table 1: Fungicide Treatment List And Timings (ml/ha unless otherwise stated)**

| Trt No. | GS30 (early stem elongation) | GS39 - 49 (flag leaf emergence- 1st awns emerging) |
|---|---|---|
| **1 SPRAY (EARLY)** | | |
| 1. | Bumper 250 | ---- |
| 2. | Bumper 250 + Flint 125g/ha | ---- |
| 3. | Bumper 250 + Flint 250g/ha | ---- |
| 4. | Bumper 250 + Flint 500g/ha | ---- |
| 5. | Opus 250 + Flint 250g/ha | ---- |
| 6. | Amistar Xtra 400 | ---- |
| **1 SPRAY (LATE)** | | |
| 7. | ---- | Bumper 250 |
| 8. | ---- | Bumper 250 + Flint 125g/ha |
| 9. | ---- | Bumper 250 + Flint 250g/ha |
| 10 | ---- | Bumper 250 + Flint 500g/ha |
| 11 | ---- | Opus 250 + Flint 250g/ha |
| 12. | ---- | Amistar Xtra 400 |
| **2 SPRAY (EARLY and LATE)** | | |
| 13. | Bumper 125 | Bumper 125 |
| 14. | Bumper 125 + Flint 62.5g/ha | Bumper 125 + Flint 62.5g/ha |
| 15 | Bumper 125 + Flint 125g/ha | Bumper 125 + Flint 125g/ha |
| 16. | Bumper 125 + Flint 250g/ha | Bumper 125 + Flint 250g/ha |
| 17. | Opus 125 + Flint 125g/ha | Opus 250 + Flint 125g/ha |
| 18. | Amistar Xtra 400 | Amistar Xtra 400 |
| 19. | Bumper 250 | Bumper 250 (control) |
| 20. | Untreated | |

Explanatory notes on new fungicides:

Bumper® 250EC contains 250g/l propiconazole, thus at 250ml/ha applies 62.5g/ha ai.

Flint® 500 WG contains 500g/kg trifloxystrobin, thus 250g/ha applies 125g/ha active ingredient.

Opus® contains 125g/l epoxiconazole, thus 250ml/ha applies 31g/ha active ingredient.

Az = Amistar Xtra® contains 200g/l azoxystrobin and 80g/l cyproconazole thus at 400 ml/ha applies 80g/ha azoxystrobin active ingredient and 32g/ha ai cyproconazole.

**Results and Discussion:**

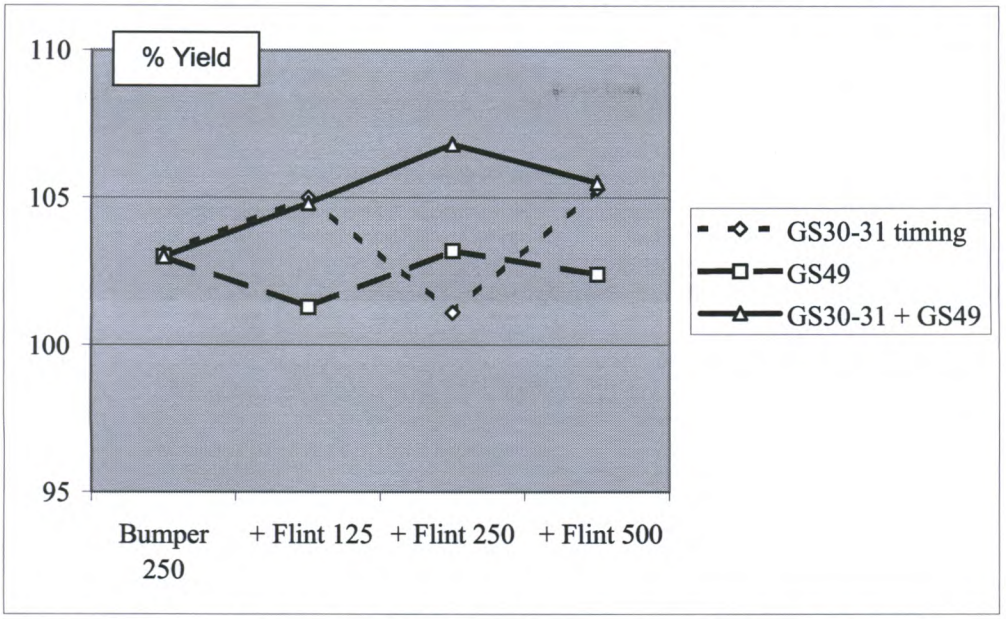
**Table 3: The Influence of Fungicide Application at Various Rates and Timings on Yield (t/ha and % Untreated Control) and % Scald Infection Assessed 16th November 18 Days after GS49 Application**

| Product | Timing of Applic'n | Rate (ml/ha) | Yield Data | | % Disease Infection | | |
|---|---|---|---|---|---|---|---|
| | | | t/ha | % | L1 | L2 | L3 |
| Bumper | GS30-31 | 250 | 8.64 | 103.1 | 2.4 | 31.5 | 42.8 |
| Bumper + Flint | GS30-31 | 250 + 125g | 8.80 | 105.0 | 0.0 | 6.0 | 4.1 |
| Bumper + Flint | GS30-31 | 250 + 250g | 8.47 | 101.1 | 0.0 | 3.5 | 6.4 |
| Bumper + Flint | GS30-31 | 250 + 500g | 8.82 | 105.3 | 1.0 | 9.1 | 5.4 |
| Opus + Flint | GS30-31 | 250 + 250g | 8.61 | 102.7 | 0.1 | 15.8 | 14.4 |
| Amistar Xtra | GS30-31 | 400 | 8.54 | 101.9 | 0.0 | 5.3 | 12.7 |
| Bumper | GS49 | 250 | 8.63 | 103.0 | 0.3 | 7.6 | 29.3 |
| Bumper + Flint | GS49 | 250 + 125g | 8.49 | 101.3 | 0.0 | 7.0 | 22.0 |
| Bumper + Flint | GS49 | 250 + 250g | 8.65 | 103.2 | 0.0 | 3.8 | 14.6 |
| Bumper + Flint | GS49 | 250 + 500g | 8.58 | 102.4 | 0.3 | 6.9 | 17.8 |
| Opus + Flint | GS49 | 250 + 250g | 8.57 | 102.3 | 0.3 | 4.1 | 13.4 |
| Amistar Xtra | GS49 | 400 | 8.79 | 104.9 | 0.8 | 11.4 | 20.8 |
| Bumper | GS30 +49 | 125 x2 | 8.63 | 103.0 | 0.0 | 2.4 | 13.3 |
| Bumper + Flint | GS30 +49 | (125 + 62.5) x2 | 8.78 | 104.8 | 0.0 | 2.8 | 2.8 |
| Bumper + Flint | GS30 +49 | (125 + 125) x2 | 8.95 | 106.8 | 0.0 | 0.6 | 3.1 |
| Bumper + Flint | GS30 +49 | (125 + 250) x2 | 8.84 | 105.5 | 0.0 | 0.3 | 1.8 |
| Opus + Flint | GS30 +49 | (125 + 125) x2 | 8.84 | 105.5 | 0.0 | 2.0 | 4.1 |
| Amistar Xtra | GS30 +49 | 400 x2 | 9.08 | 108.4 | 0.0 | 0.1 | 2.8 |
| Bumper (control) | GS30 +49 | 250 x2 | 8.64 | 103.1 | - | - | - |
| Untreated | | | 8.38 | 100.0 | 4.5 | 32.4 | 45.1 |
| **LSD (5%) [Trtd vs Trtd]** | | | **0.33** | | **2.6** | **9.4** | **10.7** |
| **CV = 2.7%** | | | | | | | |

The split timings in this barley trial significantly out yielded the single applications of the same active ingredient (p=0.01). This correlated fairly strongly with the disease assessment on Scald which illustrated that splitting active ingredient between the 2 timings was more effective than applying a single dose of the same quantity of active at either timing alone.

Whilst strobilurin fungicides had a significant impact on the level of disease, the impact on yield was relatively small, being most reliable in the 2 spray programmes (increasing yield by 2-5% - 0.15 to 0.45 t/ha). With Amistar Xtra being the only currently commercialised strobilurin mixture available (approx $40/ha for 400ml/ha), the yield increase over and above the Bumper 2 spray (0.45 t/ha) would not have made it more cost effective.

**Graph 1: Influence of Strobilurin (Flint – trifloxystrobin) Addition to Bumper (Triazole – Propiconazole) on % Yield Relative to Untreated Yield Equal to 100**




Note: At each rate of strobilurin on the graph the same amount of active ingredient has been used whether it is 2 split or a single application.

**Conclusions:**

Again the majority of individual treatment responses to fungicide were positive but not always statistically significant relative to the untreated. Despite moderate levels of Scald, yield increases were relatively modest. Though higher priced strobilurin based fungicides gave better disease control and higher yields, the yield increases were still insufficient to make applications more cost effective than triazole control treatments such as Tilt/Bumper (propiconazole).