

MORLEY RESEARCH CENTRE

Foliar fungicide programmes for triticale

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Summary

Fungicide treatments based on Folicur or Opus in mixture with Amistar, Corbel, Acanto or Twist were evaluated largely as a one-spray treatment, but also with a single two-spray programme on the triticale variety Binova, drilled on 13 November 2001 on the loamy sand soil at Colney, Norwich. These treatments were applied on 16 May (GS 49), with the two-spray programme also being treated on 1 June (GS 61). Disease levels were low in the spring and when the second treatment was applied on 1 June, traces of *Septoria tritici* were recorded on leaf 2 of untreated crop, with 0.1 and 1.0% of the area of leaves 3 and 4 respectively affected. The untreated plots were assessed on 28 June (GS 77-83) when 0.5% *Septoria tritici* was present on leaf 1 and 4.1% on leaf 2. Most of the fungicide treatments significantly increased the amount of green leaf area remaining on leaf 2, but there were no apparent differences on leaf 1. Where no fungicide was applied, the crop produced a yield of 4.61 t/ha. Treated yields ranged from 4.48 to 4.91 t/ha, but with no statistical difference between any of the treatments. However, the inclusion of Amistar in the fungicide programme tended to produce the highest yields. The soil was relatively light, making the crop vulnerable to the dry conditions which had occurred in the spring and this affected the overall level of yield and increased site variation.

Object

To examine the effect of a range of foliar fungicide programmes on triticale

Method

<i>Site</i>	New Found Farm, Colney, Norwich
<i>Soil type and series</i>	Loamy sand
<i>Variety</i>	Binova
<i>Treatments</i>	Details of treatments are given in Tables 1 & 2
<i>Sowing date</i>	13 November 2001
<i>Husbandry</i>	The crop followed potatoes, all applications as farm crop except fungicide, field details as outlined in Appendix
<i>Trial design</i>	Randomised block with six replicates
<i>Analysis</i>	ANOVA with LSD's quoted at P = 0.05
<i>Plot size</i>	12 m x 2.1 m with buffers
<i>Application</i>	Treatments (see Tables 1 & 2) were applied on 16 May (GS 49) and 1 June (GS 61) in 200 l/ha water as a medium spray using F110-03 nozzles
<i>Experiment diary</i>	See Appendix
<i>Deviations from protocol</i>	<ul style="list-style-type: none"> • First treatment timing delayed from GS 39 to GS 49

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Results

Table 1. Green leaf area on leaf 2 (% leaf area) on 28 June and grain yield (t/ha at 85% dm)

Fungicide (l/ha) 16 May (GS 49)	1 June (GS 61)	GLA on leaf 2 (%) on 28 June	Yield (t/ha at 85% dm)
1. Untreated	-	45.8	4.61
2. Folicur (0.5) + Amistar (0.5)	Opus (0.25) + Amistar (0.3)	59.7	4.71
3. Folicur (0.5) + Amistar (0.5)	-	58.2	4.88
4. Folicur (0.5) + Corbel (0.5)	-	56.2	4.59
5. Opus (0.25) + Amistar (0.5)	-	58.5	4.85
6. Opus (0.25) + Corbel (0.5)	-	57.0	4.54
7. Opus (0.25) + Amistar (0.25)	-	65.3	4.91
8. Opus (0.25) + Acanto (0.5)	-	58.3	4.69
9. Opus (0.25) + Acanto (0.25)	-	55.8	4.72
10. Opus (0.25) + Twist (1.0)	-	54.0	4.48
LSD		9.30	NS
SE per plot (45 df)±		7.97	0.305
CV (%)		14.0	6.5

Table 2. Active ingredients of commercial products used

Product	Active ingredients (ai)	g ai/l or % w/w	Formulation
Acanto	picoxystrobin	250	SC
Amistar	azoxystrobin	250	SC
Corbel	fenpropimorph	750	EC
Folicur	tebuconazole	250	EW
Opus	epoxiconazole	125	SC
Twist	trifloxystrobin	125	EC

- The crop followed potatoes and was drilled on 13 November 2001.
- Establishment was satisfactory, with 243 plants/m² recorded when counts were made on 14 January 2002
- When the first fungicides were applied on 16 May (GS 49), no disease was recorded in the crop. At the second application on 1 June (GS 61), traces of *Septoria tritici* were recorded on leaf 2 of untreated crop (leaf 1 = flag), with 0.1 and 1.0% of the area of leaves 3 and 4 respectively affected.
- Disease pressure remained low and on 28 June (GS 77-83), *Septoria tritici* was recorded on only 0.5% of the area of leaf 1 and 4.1% on leaf 2 of untreated crop and a full assessment of disease was not made. However, an assessment of green leaf area remaining (Tables 1 and A1) showed that most of the fungicide treatments significantly increased the amount of green leaf area remaining on leaf 2, but there were no apparent differences on leaf 1.
- Where no fungicide was applied, the crop produced a yield of 4.61 t/ha (Tables 1 and A1). Treated yields ranged from 4.48 to 4.91 t/ha, but with no statistical difference

between any of the treatments. The inclusion of Amistar in the fungicide programme tended to produce the highest yields. However, the soil was relatively light making the crop vulnerable to the dry conditions which had occurred in the spring and this affected the overall level of yield and increased site variation.

- Where no fungicide was applied, a specific weight of 68.4 kg/ha was recorded (Table A1). There were no significant effects of treatment.

Further details

Other experiment details and results are presented in the appendix.

Field details

Applications to crop

Experiment diary

Method

Results

Table A1 Green leaf area (% leaf area), grain yield (t/ha) and specific weight (kg/ha)

Field details

Site	New Found Farm, Colney, Norwich			
Field reference	Block 3			
Crop	Triticale			
Variety	Binova			
Previous crop	2001 Potatoes 2000 Winter barley 1999 Set aside 1998 Sugar beet			
Soil type and series	Loamy sand			
Soil analysis	pH	P	K	Mg
July 2002	8.2	3-	2-	0+
Seed rate	450 seeds/m ²			
Date sown	13 November 2001			
Cultivations	5 November 2001	Flatlifted		
	6 November	Cultivated		
		Double ring pressed		

Applications to crop

Precise treatments remain confidential but they are held on file. Appropriate treatments were applied to give a good commercial level of control of weeds, pests and crop growth and of crop nutrition.

Experiment diary

Date	GS	Treatments applied or action
13 November 2001	-	Trial drilled using Oyjord plot drill
14 January 2002	11-12	Plant count (243/m ²)
16 May	49	1 st fungicide application as per treatment list. Weather conditions sunny and hot (24°C)
1 June	61	2 nd fungicide application as per treatment list. Weather conditions sunny and warm (18°C)
28 June	77-83	Assessment of <i>Septoria tritici</i> on untreated plots only and green leaf area on leaves 1 and 2 on all plots
7 August	92	Trial harvested using Sampo 2010 "R " plot combine

Spray and assessment methods for cereal trials

This is an abbreviated version of the standard operating procedures used at Morley Research Centre.

Plot layout

Plots were sown at 450 seeds/m² with an Oyjord drill. The drilled plots were 12 m long and 1.56 m wide from outside row to outside row (14 rows at 12.0 cm spacing). Plots were separated by a buffer of the same size with a 54 cm gap between successive plots and buffers. This gave an effective plot width of 2.10 m, which was used for harvest yield calculations. Treatments were applied to the plot and to half of the buffer at each side. For harvest purposes, plot length was reduced to 9.5 m.

Overall treatments

Overall treatments such as fertiliser, insecticides, herbicides and growth regulators were applied across all plots with farm machinery using wheelings which were 24 m apart.

Spraying details

Treatments were applied using a CO₂ powered backpack sprayer, utilising 'Cornelius' vessels and a 4 m boom (eight nozzles at 0.5 m spacings) with Lurmark F110-03 nozzles at 2 bar pressure, to give 200 l/ha spray volume at 1.6 m/s forward speed.

Agronomic factors

Overall plant population was determined by making 30 counts of a 30.5 x 30.5 cm quadrat at random across the site.

Foliar disease and green leaf area

Foliar disease of a particular leaf or leaf layer was determined by the following method. A standard (based on the appropriate key from the ADAS manual of disease assessment keys, 1976) was agreed between two experienced assessors and plots were assessed by walking along the gap between the harvest area and the buffer, examining the plot from both sides. The crop was examined at intervals and an appropriate disease level was agreed at the end of each plot.

The green area of a particular leaf or leaf layer was determined by two experienced assessors walking along the gap between the harvest area and the buffer, examining the plot from both sides. The crop was examined at intervals and an appropriate green leaf area was agreed at the end of each plot.

Harvest details

Plots were harvested using a Sampo 2010 combine which was modified for plot work and used electronic weighing (Harvest Master HM-400 with Grain Gauge). Trials were harvested by replicate.

Post harvest determinations

The grain samples were pre-cleaned using a Rational sample cleaner to remove any chaff or straw before further assessments (moisture content or specific weight) were carried out.

Moisture content and specific weight were determined using a FOSS Infratec 1241-050 grain analyser.

Table of results

Table A1 *Green leaf area (% leaf area), grain yield (t/ha at 85% dm) and specific weight (kg/hl at 85% dm)*

Treatment	GLA	GLA	Grain yield	Specific weight
-	Leaf 1	Leaf 2	at 85% dm	at 85% dm
Unit	%	%	t/ha	kg/hl
Date	28/06/2002	28/06/2002	07/08/2002	
1	84.8	45.8	4.61	68.4
2	93.0	59.7	4.71	69.9
3	93.7	58.2	4.88	69.7
4	88.2	56.2	4.59	69.3
5	91.7	58.5	4.85	69.2
6	91.2	57.0	4.54	68.7
7	93.8	65.3	4.91	69.7
8	93.0	58.3	4.69	69.3
9	92.5	55.8	4.72	69.6
10	83.7	54.0	4.48	68.7
LSD (P=0.05)	NS	9.30	NS	NS
SE per plot (45 df)±	7.32	7.97	0.305	0.85
CV (%)	8.1	14.0	6.5	1.2