

MASTER

FV 91
(final report)



Horticultural Development Council

Working for Growers

Research Report

FV/91

Fungicides in Broad Beans
1991 - 1992

PROCESSORS & GROWERS RESEARCH ORGANISATION

Fungicides in Broad Beans

1991 - 1992

SUMMARY: In studies made on three trials in two years, chocolate spot (*Botrytis fabae*) and downy mildew (*Peronospora viciae*) in broad beans were controlled by a mixture of chlorothalonil and metalaxyl. In 1991, in one trial and in one of two trials carried out in 1992, benomyl alone did not control *B. fabae*.

Isolates of *B. fabae* taken from this site were totally resistant to benomyl. Disease levels in both years were low and yield was not affected by treatments.

OBJECT: To study the usefulness of a prophylactic programme of fungicides for the control of broad bean foliar diseases and to evaluate the effects on yield.

METHODS: In 1991, two field trials were carried out at Walcott and Great Barningham in Norfolk and in 1992 at Bessingham, Norfolk and Bardney, Lincolnshire in commercial crops of broad beans cv. Medes.

Each trial was fully randomised and treatments were replicated four times. Each plot size was 5 m x 2 m and consisted four rows of beans, 5 m in length. In 1991, the treatments were as follows:

Treatment	Product	Rate/ha	Application timing
1 benomyl	Benlate	1.0 kg	1 spray: first flower
2 metalaxyl + chlorothalonil	Folio	2.0 l	1 spray: first flower
3	Benlate	1.0 kg	2 sprays: first flower + 14 days
4	Folio	2.0 l	2 sprays: first flower + 14 days
5	Benlate	1.0 kg	1 spray: 14 days after first flower
6	Folio	2.0 l	1 spray: 14 days after first flower
7	Benlate	1.0 kg	1 spray: first flower
	Folio	2.0 l	1 spray: 14 days after first flower
8	Folio	2.0 l	1 spray: first flower
	Benlate	1.0 kg	1 spray: 14 days after first flower
9	untreated	-	-

Sprays were applied using a propane gas-powered Van der Weij plot sprayer at a volume of 560 l/ha through Birchmeir 160 cone nozzles at 2.5 bar.

Sprays were applied at first flower on 16.6.91 and the later spray applied at first pod set on 2.7.91. Disease scores were recorded for both chocolate spot and downy mildew on 16.7.91. The pods from the centre two rows of each plot were picked by hand and left for 24 hours before threshing in a static broad bean podding drum. The weight of the vined beans was recorded and a sample from each plot measured for maturity using a tenderometer.

In 1992 the treatments were as follows:-

Treatment	Product	Rate/ha	Application timing
1 benomyl	Benlate	1.0 kg	1 spray: first flower
2 metalaxyl + chlorothalonil	Folio	2.0 l	1 spray: first flower
3	Benlate	1.0 kg	2 sprays: first flower + 14 days
4	Folio	2.0 l	2 sprays: first flower + 14 days
5	Benlate	1.0 kg	1 spray: 14 days after first flower
6	Folio	2.0 l	1 spray: 14 days after first flower
7	Benlate	1.0 kg	1 spray: first flower
	Folio	2.0 l	1 spray: 14 days after first flower
8	untreated	-	-

Sprays were applied using a propane gas powered Van der Weij precision plot sprayer with cone nozzles (HC/0.59/3) in a volume of 220 l/ha at 2.5 bar.

At Bessingham, sprays were applied at first flower on 23.6.92 and the second spray on 6.7.92. Downy mildew (*Peronospora viciae*) and chocolate spot (*Botrytis fabae*) infection levels were recorded on 23.7.92 by assessing the % leaf area infected per node on ten randomly selected plants from each plot. At the freezing stage, one of the central two rows of plants in each plot were harvested on 7.8.92 and the yield of shelled beans recorded.

At Blankney, sprays were applied on 24.6.92 and 8.6.92. Disease assessments were made on 22.7.92 and the beans were harvested as before on 6.8.92.

In 1991, there was evidence that the chocolate spot was not being effectively controlled by the benomyl treatments and that the pathogen population may have been resistant.

In 1992, MBC resistance tests were carried out on ten isolates of *Botrytis fabae* from the Benlate, Folio and untreated plots taken at harvest time using potato dextrose agar containing 0, 5, 50 and 500 ppm benomyl.

RESULTS:

Site 1 - Walcott, Norfolk 1991

The trial was abandoned after a severe infestation of black bean aphid.

Site 2 - Great Barningham, Norfolk

Disease scores were calculated from overall assessments of the amount of chocolate spot and downy mildew present on ten randomly selected plants from each plot. The scores were recorded on a 0 - 5 scale using the following scale of infection:

- 0 - no disease lesions
- 1 - up to 5% leaf area infected
- 2 - 6-15% leaf area infected
- 3 - 16-30% leaf area infected

The results of the disease scores and yields are shown below:

1. Disease assessments and yield of broad beans - Great Barningham 1991

Treatment	Chocolate spot	Downy mildew	Yield t/ha	TR
1 Benlate	1.98	0.18	5.05	128
2 Folio T ₁	2.03	0.08	4.85	128
3 Benlate T ₁ &T ₂	1.20	0.13	5.38	131
4 Folio T ₁ &T ₂	0.58	0.03	5.02	125
5 Benlate T ₂	1.53	0.18	5.08	129
6 Folio T ₂	0.58	0.08	4.62	129
7 Benlate T ₁ Folio T ₂	0.63	0.10	5.51	127
8 Folio T ₁ Benlate T ₂	1.55	0.13	5.13	126
9 Untreated	2.03	0.15	5.40	126
LSD @ P = 0.05	0.62	0.25(NSD)	0.55(NSD)	5.5(NSD)
CV %	30.7	144.8	7.2	2.9

2. Disease assessments and yield of broad beans - Bessingham 1992

Treatment	% leaf area infected d. mildew (23.7.92) (ang. tr.)		% leaf area infected c. spot (23.7.92) (ang. tr.)		Yield (kg) (7.8.92)	Yield as % of untreated
1 Benlate T ₁	10.0	17.76	10.13	18.24	0.92	95
2 Folio T ₁	8.13	16.26	6.87	15.15	1.11	114
3 Benlate T ₁ &T ₂	9.5	17.75	7.37	15.73	0.89	92
4 Folio T ₁ &T ₂	1.65	6.74	4.37	12.04	1.01	104
5 Benlate T ₂	8.13	15.53	7.12	15.32	0.96	99
6 Folio T ₂	2.90	8.77	5.25	13.10	1.0	103
7 Benlate T ₁ Folio T ₂	2.50	8.17	5.75	13.65	1.07	110
8 Untreated	9.25	17.58	9.13	17.57	0.97	100
					(3.9 t/ha)	
LSD @ P = 0.05	4.31	4.91	2.68	2.69	NSD	
CV %	44.1	24.1	25.5	11.9	11.7	

3. Disease assessments and yield of broad beans - Blankney 1992

Treatment	% leaf area infected d. mildew (23.7.92) (ang. tr.)		% leaf area infected c. spot (23.7.92) (ang. tr.)		Yield (kg) (7.8.92)	Yield as % of untreated
1 Benlate T ₁	10.88	18.9	2.92	9.8	1.51	118
2 Folio T ₁	8.35	16.0	3.90	11.1	1.41	110
3 Benlate T ₁ &T ₂	6.28	14.0	2.95	9.8	1.48	116
4 Folio T ₁ &T ₂	3.28	10.2	3.35	9.5	1.53	120
5 Benlate T ₂	11.63	19.5	4.85	12.3	1.34	105
6 Folio T ₂	3.55	10.4	1.67	7.4	1.54	120
7 Benlate T ₁ Folio T ₂	3.98	10.8	1.72	7.4	1.32	103
8 Untreated	8.73	16.9	5.15	13.0	1.28	100
					(5.12 t/ha)	
LSD @ P = 0.05	4.02	4.1	NSD	NSD	NSD	
CV%	37.9	18.9	58.2	28.6	14.6	

4. Botrytis fabae resistance tests 1992

Treatment	% MBC - resistant isolates	
	Bessingham	Blankney
1 Benlate T ₁ & T ₂	100	10
2 Folio T ₁ & T ₂	100	45.5
3 Untreated	100	40

CONCLUSIONS: Disease levels were not very high overall in the two years although chocolate spot and downy mildew infection was higher in 1992 than in 1991.

The later applications of Folio significantly reduced downy mildew in all trials and chocolate spot in two trials. In 1991, Benlate did not control chocolate spot and there was an indication of a resistant population of *B. fabae*. In 1992, at Bessingham, Benlate again failed to control chocolate spot and tests made on isolates of *B. fabae* from this site showed a completely resistant population. At Blankney, chocolate spot levels were lower than Bessingham and differences between treatments were not statistically significant. Isolations of *B. fabae* indicated a mixed population of susceptible and resistant strains.

Although the diseases were controlled by Folio there were no statistically significant yield differences between the treatments at any of the sites in both years.

Disease levels were generally low, but there was a clear indication that prophylactic treatment was not justified in these circumstances, and that the use of MBC fungicides on their own are of no benefit.

A.J. Biddle
October 1992