
Effect of Spray Timing on White Mold and
Seed Yield of White Bean

J.G. Morton and R. Hall

Department of Environmental Biology
University of Guelph
Guelph, Ontario, Canada
N1G 2W1

Experiments were conducted at three locations; Arkell, Mitchell and Ailsa Craig. They were arranged as randomized complete blocks with three or four replications. Plot size ranged from 7.5 m² at Arkell to 0.38 ha at Ailsa Craig. At each location white mold incidence, expressed as the percentage of diseased plants, was determined several times during the season. Seed yield was obtained at Arkell and Mitchell.

At the Arkell Research Station of the University of Guelph, Seafarer beans were planted June 11. Plots contained three rows of beans, 0.75 m apart and 5 m long. There were six treatments. Check plots were left unsprayed. Sprayed plots received Benlate 50W at a rate of 2 kg/ha in 2270 L water/ha applied with a Solo backpack sprayer. Chemical was applied at 100% bloom (July 29), or August 7, or August 13, or August 18, or five times at weekly intervals during blooming and pod fill from July 23 to August 20. Observations on disease were made on 50 plants from the centre row of each plot on September 4. Disease incidence was the number of plants with white mold, expressed as a percentage of the total number of plants examined. Seed yield was determined from the central 3.3 m of the centre row of each plot by hand-shelling all pods collected on September 10 and drying the seeds to 16% moisture content.

In unsprayed plots 62.5% of the plants had white mold on September 4 (Table 1). One spray on August 7 did not significantly reduce disease incidence or increase yield. One spray at bloom (July 29) or mid-August, i.e. August 13 or August 18, and five sprays on a regular 7-day schedule from July 23 all significantly reduced disease compared to the check and significantly increased yield by 40 to 50%. Differences among these treatments were not significant.

At Mitchell, Kentwood white beans were planted on June 5. Three replications were used. Plots were 8 rows wide, 0.75 m apart, 54 m long and separated by 8 rows of beans. Blocks were separated by a guard strip 10 m wide. The check plots were left unsprayed. In treatment plots spray was applied either at full bloom (July 23) or when approximately 5% of the plants were infected with white mold (August 11). Plots were sprayed with Benlate 50 W at 1 kg/ha with a Hiboy sprayer that delivered 243 L/ha at 84 psi through two drop nozzles and one overhead nozzle per row. The spray was applied by a commercial operator. Disease progress through the season was monitored at intervals through the season by selecting from the centre four rows 100 plants spaced equidistant along the rows. Disease was measured as the number of plants with symptoms of white mold. Plots were harvested on September 13. Weight of beans was determined at 19% moisture.

White mold in the unsprayed check plots increased from 2.0% on August 6 to 67.7% on September 8. In plots sprayed at 100% bloom (July 23) before disease was seen, disease was reduced compared to the check plots on August 11 and August 20 but by August 27 had caught up to the level in check plots. When the spray was delayed until 5% of the plants had white mold symptoms (August 11) white mold developed thereafter more slowly than it did in check plots and by September 8 was still significantly lower than in other treatments (Table 2). There were no significant effects of spraying on yield.

At Ailsa Craig, Fleetwood white beans were planted by the co-operator. Plots contained 12 rows 0.75 m apart and were 695 m long. Benlate 50 W was applied at 1 kg/ha with a tractor-pulled FMC sprayer which delivered 364 L/ha at 200 psi through hollow cone nozzles mounted above the crop. There were four replications per treatment. Check plots were left unsprayed. Treated plots were sprayed at 100% bloom (July 31), at bloom and 19 days later (August 19), or when 27% of the plants had symptoms of white mold (August 19). The spray was applied by the grower. Disease was measured on four occasions in each plot, as the number out of 100 plants that had white mold. Plants rated for disease were removed from the centre four rows at equidistant points along the plot.

White mold in the unsprayed check plots increased from 0.75% on August 11 to 71.0% on September 9. One spray on July 31 did not significantly reduce disease incidence. However, two sprays (July 31 and August 19), or one spray after bloom (August 19) did reduce disease slightly but significantly on September 9 (Table 3).

We conclude that one spray during mid-August can reduce the incidence of white mold, that yield is reduced if more than 30% of the plants have white mold and that to increase yields significantly, the incidence of white mold must be reduced by at least 30%.

Table 1: Effect of Benlate 50 W at 2 kg/ha on white mold and seed yield in Seafarer beans at Arkell.

Treatment	White Mold Sept. 4 (%)	Seed Yield Sept. 10 (kg/ha)
Check	62.5 a ⁺	552 a
Spray Aug. 7	46.5 ab	627 ab
Spray Aug. 13	31.5 bc	787 bc
Spray July 29	28.0 bc	849 c
Spray Aug. 18	23.5 bc	813 bc
Five sprays (July 23 - Aug. 20)	12.0 c	865 c

Table 2: Effect of Benlate 50 W at 1 kg/ha on white mold and seed yield in Kentwood beans at Mitchell.

Treatment	White Mold Sept. 8 (%)	Seed Yield Sept. 13 (kg/ha)
Check	67.7 b ⁺	2605 a
Spray at bloom (July 23)	66.3 b	2635 a
Spray at 5% disease (August 11)	46.3 a	2633 a

Table 3: Effect of Benlate 50 W at 1 kg/ha on white mold in Fleetwood beans at Ailsa Craig.

Treatment	White mold Sept. 9 (%)
Check	71.0 b ⁺
Spray at bloom (July 31)	67.0 ab
Spray at 27% disease (Aug. 19)	58.5 a
Spray July 31 and Aug. 19	55.0 a

⁺ Values in a column followed by a common letter are not significantly different at P = 0.05 (Duncan's New Multiple Range Test).

Effect of Numbers of Apothecia of Sclerotinia sclerotiorum
on White Mold of White Bean

G.J. Boland and R. Hall

Department of Environmental Biology
University of Guelph
Guelph, Ontario Canada
N1G 2W1

The effect of number of apothecia of Sclerotinia sclerotiorum on the subsequent number of white bean plants (Phaseolus vulgaris) infected with white mold was investigated at Guelph in 1981. The plot measured 23 m x 21 m and was planted in 0.75 m rows with the susceptible variety Seafarer. Each row was divided into 2 m subplots. The number of apothecia was