

## FUNGICIDE, ROW WIDTHS AND PLANT DENSITIES AFFECTING WHITE MOLD INTENSITY

Rogério Faria Vieira<sup>1</sup>, Cleide Maria Ferreira Pinto<sup>1</sup>, and Trazilbo José de Paula Júnior<sup>1</sup>

<sup>1</sup> Epamig, Vila Gianetti, 47, Viçosa, MG 36571-000 Brazil

### Introduction

White mould caused by *Sclerotinia sclerotiorum* has increased on irrigated bean in the past 10 years in Brazil, especially during the fall-winter growing season. Low temperature, high humidity and plant canopy and/or soil surface wetting favour disease progress. Therefore, wider row and/or plant spacing may provide less favourable environmental conditions due to better light penetration into plant canopy and soil, and more ventilation. The objective of this research was to study the implementation of combined strategies against white mould, which included plant density adjustments and fungicide application.

### Material and Methods

Experiments were carried out in Viçosa (State of Minas Gerais, Brazil) in a bean field naturally infested with sclerotia of *S. sclerotiorum*. Seeds of the cultivar 'Pérola' were sown on May (end of fall) of 2002 and 2003. The trials were conducted as a 2x2x2 factorial: two row widths (0.50 or 0.75 m), two plant densities in the rows (6 or 12 plants/m) and two fungicide treatments (with or without application). A randomised complete-block design with six replications was used. Plot size was 15 m<sup>2</sup> and each row 5 m long. The trials were sprinkler irrigated. The fungicide fluazinam (0.5 l/ha) was applied at 45 (early bloom) and 55 days after emergence (DAE). An area of 1.2 m<sup>2</sup> of each plot was separately harvested for disease evaluation at 90 DAE. Incidence of white mould was evaluated considering % of plants with symptoms on stem or branches. Plants were rated for severity with a scale from 0 to 4 (Hall & Phillips, 1996). Yield and 100-seeds weight were also evaluated.

### Results and Discussion

Disease intensity was higher in 2002 than in 2003. Fungicide reduced disease intensity in both years (Tables 1 and 2), but plant arrangements were only significant in 2002 (Table 1). In 2002, fluazinam also reduced rust severity. Depending on year, larger width row, lower plant density, and fungicide application increased 100-seed weight (Tables 1 and 2). An interaction between row widths and fungicide treatments on yield occurred in 2002 (Table 3). When fungicide was applied, bean yield was higher at 0.50 m (3018 kg/ha) than at 0.75 m (2650 kg/ha). When fungicide was not applied, there was no significant difference between row widths. In 2003, fungicide did not increase yield significantly. Results show that lower plant density (6 plants per meter) does not decrease bean yield, regardless of white mold intensity, and that reduction of disease intensity by fluazinam does not mean higher yield in years not favourable for white mold. Larger row width could be used in areas where disease is not serious or no fungicide is used.

Table 1. White mold intensity, rust severity, 100-seed weight and grain yield at two row widths, two plant densities, and with or without fluazinam (Viçosa, Brazil, 2002)

Row width	Density	Fungicide	White mold incidence <sup>1</sup>	White mold severity	Rust severity <sup>2</sup>	100-seed weight (g)	Yield (kg/ha)
50			46.1** (51.9)	1.54**	2.00*	25.5*	2599
75			34.0 (34.6)	0.94	2.25	26.3	2428
	6		34.9* (35.6)	0.95**	2.19 <sup>ns</sup>	26.1 <sup>ns</sup>	2572 <sup>ns</sup>
	12		45.2 (50.9)	1.54	2.06	25.7	2455
		With	29.3** (26.8)	0.66**	1.33**	26.9**	2834
		Without	50.8 (59.7)	1.83	2.92	25.0	2193

<sup>1</sup> Between parenthesis are untransformed mean percentage of incidence.

<sup>2</sup> 1 = no symptoms, 3 = low severity.

\*\* = significant at 1% level, \* = significant at 5% level, ns = not significant.

Table 2. White mold intensity, 100-seed weight and grain yield at two row widths, two plant densities, and with or without fluazinam (Viçosa, Brazil, 2003)

Row width	Density	Fungicide	White mold incidence <sup>1</sup>	White mold severity	100-seed weight (g)	Yield (kg/ha)
50			41.3 <sup>ns</sup> (43.6)	0.79 <sup>ns</sup>	26.1**	2251 <sup>ns</sup>
75			46.5 (52.4)	1.02	27.8	2067
	6		44.1 <sup>ns</sup> (48.3)	0.80 <sup>ns</sup>	28.1**	2131 <sup>ns</sup>
	12		43.7 (47.7)	1.01	25.8	2188
		With	39.6** (40.9)	0.61**	27.4 <sup>ns</sup>	2192 <sup>ns</sup>
		Without	48.3 (55.1)	1.20	26.5	2126

<sup>1</sup> Between parenthesis are untransformed mean percentage of incidence.

\*\* = significant at 1% level, \* = significant at 5% level, ns = not significant.

Table 3. Interaction between row width and fungicide treatments on bean yield (kg/ha) (Viçosa, Brazil, 2002)

Row width	Fungicide		Difference
	with	without	
0.50 m	3018	2180	838**
0.75 m	2650	2206	444**
Difference	368**	26 <sup>ns</sup>	
C.V. (%)	12.2		

\*\* = significant at 1% level, ns = not significant.

#### Reference:

Hall, R., Phillips, L.G. 1996. Evaluation of parameters to assess resistance of white bean to white mold. Ann. Rep. Bean Improv. Coop. 39, 306-307.