

lead to serious errors in estimating canopy wetness. Inside the dense canopy, water stays in the liquid state for longer periods than in an open canopy. The open A55 canopy allows many of the leaves to see the sky during periods of dew formation, as well as leaf drying. Differences in canopy architecture and leaf movement can explain the initially incongruous results of this experiment and give insight into the epidemiology of white mold disease of dry edible beans.

References

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AN APPROACH TO CONTROL OF BEAN GOLDEN MOSAIC VIRUS IN DRY BEANS (*Phaseolus vulgaris* L.)

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Bean golden mosaic virus (BGMV), transmitted by the white fly *Bemisia tabaci* (Genn.) is the main disease of dry beans in the south west of Goiás, Mato Grosso do Sul, the north of Paraná, and in some areas of Minas Gerais and São Paulo - Brazil, during the dry season plantings. The present study was conducted at the Federal Agricultural College at Rio Verde - Goiás, in 1982. The objective was to evaluate the use of tolerant cultivars and the chemical control of the white fly-vector as methods of control for BGMV.

The experiment was a split-split plot in a randomized complete block design with 3 replications. Treatments (sub-sub plots) consisted of 5 cultivars: Miranda 5 MDS/76, Carioca, Turrialba 1, G 02495 MDS/76, and G 02447 MDS/76; seed treatment (subplots): Carbofuran (Furadan 350F) at a rate of 460 ml a.i./100 kg of seed; and 0.1 or 2 foliar sprays (plots): Monocrotophos (Azodrin 60 CE) at a rate of 300 ml a.i./ha. Foliar sprays were applied at 30 and 50 days and symptoms evaluated at 60 days after planting, respectively. Symptoms were evaluated on a 0 to 5 scale (Manual de Métodos de Pesquisa em Feijão - EMBRAPA/CNPAF, 1976). The percentage of plants in each class of the scale was recorded and the disease index calculated as follow:

$$D.I.(%) = \frac{\sum (\text{Percent infected plants} \times \text{Disease class})}{5}$$

The amount of disease in cv. Carioca was significantly higher ($P=0.05$) when compared with the other cultivars. As the number of foliar sprays increased, the mean disease incidence decreased (Table 1). An analysis of variance for yield showed significant differences among cultivars. There was no difference between 1 or 2 foliar sprays, but they were significantly different from the controls (Table 2). Although no significant differences were observed when carbofuran treated seeds were used, an increase in yield over controls was observed in the absence of foliar sprays.

Based on these results, cv. Miranda 5 MDS/76 and one foliar spray 30 days after planting should be indicated.

TABLE 1. Mean disease index for bean golden mosaic virus in 5 cultivars receiving 0.1 or 2 foliar sprays of monocrotophos at Rio Verde, Goiás Brazil- 1982.

Cultivars	Number of foliar sprays ($\Delta=8.65$)			Cultivar mean ($\Delta=4.99$)
	0	1	2	
Miranda 5 MDS/76	21.33 a*	13.60 a	9.50 a	14.81 a
G 02447 MDS/76	16.17 a	14.87 a	11.50 a	14.18 a
G 02495 MDS/76	18.33 a	9.13 a	9.67 a	12.38 a
Turrialba 1	17.33 a	10.53 a	11.83 a	13.23 a
Carioca	58.13 b	32.83 b	30.00 b	40.32 b
Foliar spray mean ($\Delta= 1.45$)	26.26 a	16.19 b	14.50 c	18.98

* Means in the same column followed by the same letter do not differ by Tukey's test ($P=0.05$).

TABLE 2. Mean yield in kg/ha for 5 cultivars of dry beans receiving 0.1 or 2 foliar sprays of monocrotophos to control white fly at Rio Verde, Goiás, Brazil - 1982.

Cultivars	Number of foliar sprays ($\Delta=181.34$)			Cultivar mean ($\Delta=104.69$)
	0	1	2	
Miranda 5 MDS/76	479.17 a*	848.75 a	901.67 a	743.20a
G 02475 MDS/76	495.42 a	659.57 b	753.32 a	636.10 b
G 02495 MDS/76	502.50 a	615.42 b	780.82 a	632.91 b
Turrialba 1	435.82 ab	639.17 b	729.57 ab	601.52 bc
Carioca	263.75 b	624.57 b	647.50 b	511.94 c
Foliar spray mean ($\Delta=107.64$)	435.33 a	677.50 b	762.58 b	625.13

* Means in the same column followed by the same letter do not differ by Tukey's test ($P=0.05$).