

Interaction of Soil Fungicides with the Whitefringed Beetle in Snap bean

Donald R. Sumner and Richard E. Baird, Department of Plant Pathology,
and Richard B. Chalfant and Russell J. Ottens, Department of Entomology,
University of Georgia, Coastal Plain Experiment Station,
Tifton, GA 31793-0748

Materials and Methods

The experiment was conducted on a field of Fuquay sand at the Coastal Plain Experiment Station that had been planted in peanut the previous year. The soil was disk-harrowed, deep-turned (10-12 inches) with a moldboard plow, and raised beds 6 ft wide were prepared with a bed shaper. Ammonium nitrate (100 lbs/A), 10-10-10 (300 lbs/A), and Sul-Po-Mag (0-0-22, 100 lbs/A) were applied, the beds were rototilled 4-6 inches deep, and 0.5 inch water was applied with overhead sprinkler irrigation.

A randomized complete block design with five replications was used. Each plot was one row 10 ft long with 50 seeds spaced 2-2.5 inches apart and 1-1.5 inches deep. Snap bean variety Strike (treated with captan) was planted March 27. Treatments are shown in Table 1. Aliette + Rovral, Ridomil 2 EC + Rovral, and Rovral were applied by hand with a sprinkler can in 1000 ml of water per 10 ft of row. One half of the suspension was applied in a 6 inch band in-furrow over the seed at planting and the other half in a 6 inch band over the row immediately after covering the seed. Ridomil PC 11G granules were sprinkled over the seed by hand in-furrow. Basidiomycetes, isolated from soil, and Epiccocum nigrum were grown on 3% cornmeal-sand 3-4 wk, and applied over the seed in-furrow, 100 ml (133g) 110 ft of row. For the E. nigrum seed treatment, the fungus was grown on potato dextrose agar 7 days in a flask, the conidia mixed with water and pel-gel, and the seed overcoated with slurry. Dacthal was applied for weed control and the experiment was irrigated with 0.5 inch water. No soil insecticides were applied at planting.

Plant stand was recorded 7, 13, and 21 days after planting. Plants were dug from 2 ft on each end of each plot and evaluated for root and hypocotyl disease severity 27 days after planting. Fungi were isolated and identified from 10 lesions selected at random in each treatment in two replications. Plants in the remaining 6 ft of row were rated for phytotoxicity 14, 27, and 37 days after planting. Plants were side-dressed with 20-0-20 (200 lbs/A) 6 wk after planting, and sprayed with Sevin to control worms 8 wk after planting. Plots were harvested for green pods for fresh marked twice, 59 and 66 days after planting.

Results and Discussion

The whitefringed beetle (Graphognathus spp.) caused seedling injury, and most of the bald (stunted, deformed) plants were caused by injury from that insect (Table 1) and not by root and hypocotyl disease. The injury was most severe in the Aliette + Rovral and Ridomil PC 11G treatments. In contrast, the Ridomil 2 EC + Rovral and the Rovral treatments were not different from the control. Since Aliette and Ridomil are both active against fungi in the class Oomycetes, it is possible that the fungicides were controlling fungi in that class that provide natural control of the insect in soil. Rovral alone or with Ridomil 2 EC was not different from the control. The iprodione in Rovral may have counteracted the effects of the metalaxyl in Ridomil 2 EC on the insect. An alternative hypothesis is that metalaxyl and the fosetyl-Al in

Aliette may have made the bean hypocotyls more attractive to the insect because of increased exudation or other attractants in the rhizosphere or the plant.

The only phytotoxicity observed in the test was a light chlorosis on the margins of the primary leaves in the treatment with Ridomil PC 11G. The symptoms disappeared with time, and there were no observable differences in growth among treatments 5 wk after planting.

The fungi isolated most commonly from lesions on roots and hypocotyls in the control treatments were Fusarium oxysporum, Fusarium spp., and Rhizoctonia solani, in order. Pythium spp. were not isolated from lesions in any treatment.

Epiccocum nigrum seed treatment reduced plant stand 13 days after planting, but there were no significant differences among other treatments in plant stand 13 and 21 days after planting, nor in post-emergence damping off 21 days after planting. Root and hypocotyl disease severity was significantly less in the Rovral and Rovral + Ridomil 2 EC and E. nigrum seed treatments than in the other treatments, and one of the basidiomycetes increased disease. There were no significant differences between the control and any of the treatments in yield of green pods (Table 1).

Table 1. Control of root diseases in snap bean with soil fungicides, 1990

Treatment	Rate/A (14,520 ft or row a.i. (lb)	Live plants/10 ft of row 13 Days	Balds 14 days ^x %	Plants with severe root disease ^y %	Yield green pods lb/A
Control	0	45 a	15 c ^z	34 bcd	6962 abc
Aliette 80WP + Rovral 4SC	4.0 2.0	44 a	38 a	38 bcd	7149 abc
Aliette 80WP + Rovral 4SC	2.0 1.0	46 a	36 a	42 bc	5164 c
Ridomil PC 11G	1.1	44 a	30 ab	49 ab	7288 abc
Ridomil 2 EC + Rovral 4SC	0.125 1.0	45 a	16 c	17 de	5191 c
Rovral 4SC	2.0	44 a	21 bc	14 e	5260 c
<u>Epiccocum nigrum</u>	426	44 a	16 c	32 bcde	7907 ab
Basidiomycete 5362	426	44 a	22 bc	49 ab	5901 bc
Basidiomycete 5374	426	45 a	17 c	29 bcd	9353 a
Basidiomycete 5445	426	42 ab	26 abc	71 a	5725 bc
Basidiomycete 5380	426	39 bc	16 c	21 cde	7747 ab
<u>Epiccocum nigrum</u> (seed)	-	37 c	17 c	13 e	6887 bc

^x Stunted, deformed seedlings lacking two normal cotyledons and primary leaves.

^y Plants with more than 50% root and hypocotyl discoloration and decay plus dead plants, 27 days after planting.

^z Numbers in columns followed by different letters are significantly different according to T-tests, P = 0.05. No letters indicates no significant differences.