Soil Technologies Corp.
Research and Development Department

Research Report

Title: Evaluation of Armorex and Fungastop on the Treatment of Downy Mildew

Location: Japan

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Crop: Cucumber (Variety Hikari-3-gou-P)

Date: August 2, 2001

Abstract:
The purpose of this study was to assess the fungicidal potential of Armorex[1] and Fungastop[2]in treating downy mildew (*Pseudoperonospora cubensis*) on cucumber plants in comparison to Chlorothalonil[3]. Plants were treated with 12 protocols then inoculated with *P. cubensis.* The plants were then evaluated for disease severity and a protective value was established for each of the protocols. All three products had high efficacy against *P. cubensis*. Maximum protective values of the treatments were as follows: Chlorothalonil 100%, Armorex 97.0%, Fungastop 92.4%.

Methods:
Cucumber plants were grown to the true leaf stage in a greenhouse setting. Each pot received 20 mL of one of the following 12 protocols: Fungastop at a concentration of 1%, .5%, .25%, .125%; Armorex at a concentration of 15%, 7.5%, 3.75%, 1.88%; Chlorothalonil at 16.7 ppm, 8.4 ppm, 4.2 ppm, 2.1 ppm. Additionally, there was a control plot with no treatment. One day after treatment, plants were inoculated with powdery mildew 10^3 spores/mL. Four days after inoculation the plants were evaluated for severity of disease on the first and second leaves.

[1]Armorex is a minimum risk pesticide manufactured by Soil Technologies Corp. in Fairfield, IA USA
[2]Fungastop is a natural alternative to synthetic agro-industrial chemicals with antifungal and antibacterial compounds manufactured by Soil Technologies Corp. in Fairfield, IA USA
[3]Chlorothalonil is a chemical pesticide regulated by the US EPA

Results:

Disease severity of *P. cubensis* on the control plant was evaluated at 82.5%. All treatment protocols demonstrated the ability to reduce the disease severity. Chlorothalonil had a 100% protective value at its three highest concentrations. Fungastop had a protective value of 92.4% at 1% concentration. Armorex had a protective value of 97.0% at its two highest concentrations, but both showed signs of phytotoxicity and a protective value of 89.4% at 3.75% concentration with no signs of phytotoxicity. Results are shown in Table 1.

Material	Concentration	Disease Severity (%)	Protective Value (%)	Phytotoxicity
Fungastop	1.00%	6.25	92.42%	--
	0.50%	12.5	84.85%	--
	0.25%	12.5	84.85%	--
	0.13%	17.5	78.79%	--
Armorex	15.00%	2.5	96.97%	++
	7.50%	2.5	96.97%	++
	3.75%	8.75	89.39%	--
	1.88%	18.75	77.27%	--
Chlorothalonil	16.5 (ppm)	0	100.00%	--
	8.4	0	100.00%	--
	4.2	0	100.00%	--
	2.1	2.5	96.97%	--
Control		82.5		--

Table 1: Results of test across all protocols

Conclusions:

All treatments demonstrated a high capacity for providing protection against downy mildew. Chlorothalonil provided 100% protection at several concentrations while Armorex provided a 96.97% protective value at 15% and 7.5% concentration but with signs of phytotoxicity. Fungastop also demonstrated efficacy with a maximum protective value of 92.42%.