F. Cucumber **Powdery Mildew**

Suburst Plant Disease Clinic

Introduction

The Powdery Mildews (*Ascomycotina*) represent a broad group of cosmopolitan, obligate plant parasites. The group comprises various species. The common name amply describes the primary symptoms on the host tissue surface. It is characterized by a mealy white fungal growth, to the naked eye appearing velvet-like or "powdery" in texture. This powdery appearance is imparted by sporulation and the presence of numerous tufts of clear to white asexual spores. Control of this formidable pathogen has beset growers and homeowners since domestication of flora. Common means of control have revolved about applications of sulfur, copper, various classes of fungicides or various combinations thereof. Recently, J.H. Biotech, Inc. (Ventura, CA) have introduced a new product, GC-3, with apparent efficacy against powdery mildews, applied as a spray. GC-3 represents a proprietary product derived originally as an extract of garlic (*Allium sativum*). This report summarizes a formal replicated greenhouse trial testing the merits of GC-3 against a model powdery mildew pathogen, host and standard fungicide.

Materials and Methods

The test plant used was the Oriental Cucumber (*Cucumis sativus var. Orientalis*). Three (3) seeds were planted directly into 8" diameter plastic pots. The planting media consisted of 75% standard (sterilized) potting soil + 10% perlite +10% river sand + 5% vermiculite. Moisture levels were maintained near 80% field capacity. When reaching the 3rd leaf stage all plants were rogued to a single plant. Plants were watered daily via an automatic delivery stystem irrigating with ½ strength Hoagland's Solution. All plants were trellised with nursery rope suspended from greehnouse rafters. On day 50 all plants were inoculated with the powdery mildew conidia of *Sphaerotheca fuligenea*. Infected leaves from melons were gently rubbed onto each leaf of the cucumber plants. Plants were set in a Completely Randomized Design with 8 replications and 4 treatments. The 4 treatments were as follows:

	Application				
Treatment	**1**	**2**	**3**	**4**	**Evaluation**
Control	-	-	-	-	Day 85
* Chlorothalonil (Chl)	Day 60	Day 67	Day 74	Day 81	Day 85
**GC-3 (G) day 60	Day 60	Day 67	Day 74	Day 81	Day 85
Chl + GC	Day 60 (G)	Day 67 (Chl)	Day 74 (G)	Day 81 (Chl)	Day 85

* Chlorothaloni @ 2 qt BRAVO 500 per 100 gallons mix.

**GC-3 @ 1 gal GC-3 per 100 gallons mix.

All plants were sprayed to run-off. Shields were set in place to obviate cross treatments. On day 85 all plants were evaluated utilizing the University of California Pathogenicity rating scale (0-5):

Scale	% Infection
0	0%
1	1-10%
2	10-30%
3	30-70%
4	70-90%
5	90-100%

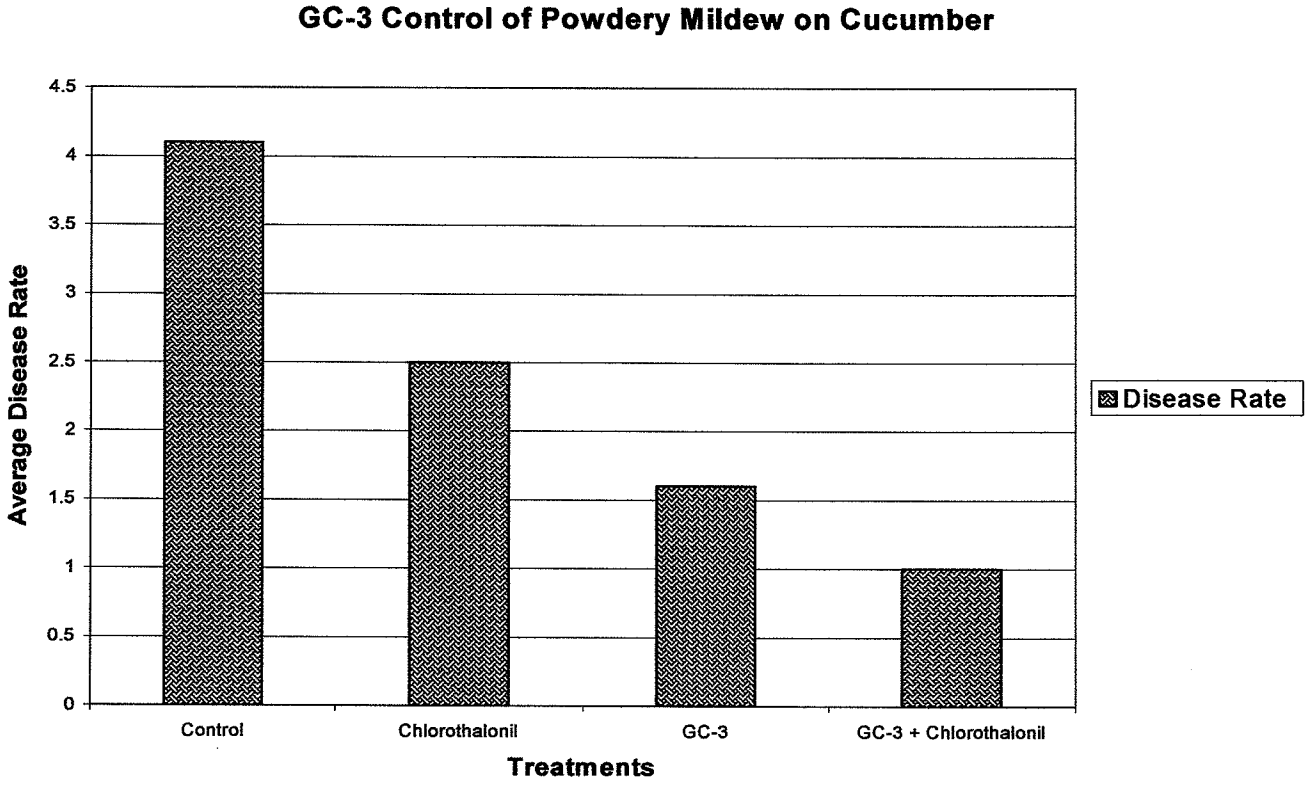
Statistical analyses were conducted using mean separation via Duncan's Multiple Range Test (5% level of Significance).

Results

Most of the untreated plants (Control) were completely overrun by powdery mildew. This was evident by days 17 following inoculation (day 50). Chlorothalonil treatments provided noticeable control but appeared to elicit a slight phytotoxic response as evidenced by degrees of leaf chlorosis. GC-3 performed in an exemplary manner but there appeared to be occasional, slight yellowing of foliage. Rated slightly above GC-3 treatments was the combination of GC-3 with Chlorothalonil alternating GC-3 sprays alone with Chlorothalonil sprays by itself (7-day intervals beginning with GC-3). All treatments were significantly superior to the control with the order of ranking as 1) GC-3 + Chlorothalonil, 2) GC-3 and 3) Chlorothalonil (see table).

REPLICATIONS

Treatment	1	2	3	4	5	6	7	8	Total	Mean
CONTROL	4	4	5	4	5	3	3	5	33.0	4.1 a
Chlorothaloni	2	3	2	2	2	3	3	3	20.0	2.5 b
GC-3	2	1	2	1	1	1	2	3	13.0	1.6 c
GC-3 + Chlorothalonil	1	0.1	0.1	2	0.1	2	1	2	8.3	1.0 d



Discussion

At the rate of 1 galloon per 100 gallons of mix the GC-3 performed well. Plants appeared to respond favorably to GC-3 approximating a nutrient response. Foliage was generally higher in green pigmentation and of higher vigor and size. When alternated with the fungicide, Chlorothalonil the GC-3 rendered a slight but significantly higher degree of powdery mildew control.

The efficacious performance of this product (GC-3) against *S. fuligenea* on cucumbers warrants that additional tests be documented spanning alternate crops and powdery mildew species.