

INTRODUCTION

Plants with powdery mildew are so conspicuous and striking that almost everybody notices them. Powdery mildew fungi occur all over the world (Freeman and Pepin (1977) and Mass (1984). On some crops, the disease occurs almost every year and causes great damage. These fungi attack important crops including legumes, cucurbits, solaniaceae, fruits, flowers, ornamentals and field crops. At the same time, it was noticed that damage caused by powdery mildew has increased in the world. *Sphaerotheca fuliginea* (Schlecht.) Poll, *Erysiphe cichoracearum* Dc and *Leveillula taurica* (Lev.) Arnaud. infect cucurbits across the world. *S. Fuliginea* and *E. cichoracearum* are more commonly encountered on cucurbits than *L. taurica* (Khan, (1989) and Sitterly (1978)).

GC-3 is an organic fungicide recommended for the control of powdery mildew on various crops. The present study was planned to evaluate the product against powdery mildew on some vegetable crops under heavy disease pressure in Egypt.

MATERIALS AND METHODS

Effect of GC-3 on spore germination

GC-3 was tested to study its effect on conidial germination. GC-3 was applied at six-concentration i. e, 0, 100, 200, 400, 800, and 1600 ppm. Conidia of fungi causing powdery mildew of squash and pepper were harvested from fresh young lesions and deposited at GC-3 concentrations on 2.5 X 7.5cm glass slides previously rinsed in ethyl alcohol and dried before use. Each slide was placed on a U- shaped glass rod in a chamber made simply from a sterile petri-dish with several layers of blotting paper on the bottom moistened with sterile water. Four replicates were used for each treatment. Petri-dishes were incubated for 24 hours before examination. The percentage of germination was calculated.

Effect of spraying GC-3 on some powdery mildew diseases:

A complete randomized block design with four replicates was used. Plot size was 1/100 of acre. Plants were left for natural infection. Thirty days after planting, squash and pepper plants were sprayed with GC-3 at 1, 2 and 4 % concentration. Control treatment was sprayed with water. Spraying was repeated every week for five weeks. Plants received a total of 5 sprays. Traditional agricultural practices were followed throughout the season.

Disease's severity was estimated, one week after the last application according to the technique of Townsend and Heuberger (1943). Mildewed leaves were categorized as follows:

0 = No mildew, 1 = Quarter of blade mildew, 2 = Half of blade mildew, 3 = Three quarter of blade mildew, 4 = More than three quarter of blade mildew. Percentage of disease's severity was calculated according to the following formula:

$P = \frac{\sum (n \times v)}{4N} \times 100$ where:

P = percentage of disease's severity, n = Number of leaves in each category,

v = numerical value of each category. N = Total number of leaves in sample.

RESULTS and DISCUSSION

1- Effect of GC-3 on spore germination:

Different concentrations of GC-3 were investigated on germination spores of powdery mildew pathogens (squash and pepper). As shown in table (1), all concentrations used reduced significantly the percentage of conidial germination. Increase of the concentration resulted in an obvious decrease in conidial germination. GC-3 (1600 ppm) completely inhibited the germination of the spores. GC-3 at 100, 200, 400 and 800 ppm. showed the germination rates of 23.4, 20, 13.3 and 8.3 %, respectively compared with the control 60.2 % in case of squash mildew. The same trend was observed for the germination of pepper powdery mildew.

Table (1): Effect of GC-3 on spore germination of squash and pepper powdery mildew pathogens

Concentration (ppm)	% germination spores of powdery mildew pathogens			
	Squash		Pepper	
	Percentage	Reduction index	Percentage	Reduction index
0	60.2	-	46.0	-
100	23.4	61.1	26.5	42.40
200	20.0	66.8	17.5	61.96
400	13.3	77.9	14.8	67.80
800	08.3	86.2	07.5	83.70
1600	00.0	100	00.0	100.0
L.S.D. at 5 %	7.14	-	3.83	-

2- Control of powdery mildew by GC-3

Effect of spraying with GC-3 on powdery mildew of squash and pepper was evaluated. Data presented in table (2) and fig. (1) indicated that all concentrations (1, 2 and 4 %) reduced significantly the severity of the infection compared with the control. The reduction of disease's severity decreased by increasing the concentration of GC-3.

Statistical analysis showed no significant difference between the two concentrations 2 and 4 % for the two diseases. Therefore, the concentration of 2 % is recommended for the control of the powdery mildew on squash and pepper.

Table (2): Effect of GC-3 on squash and pepper infection with powdery mildew.

Rate of use (%)	Squash		Pepper	
	% Disease severity	Disease reduction index	% Disease severity	Disease reduction index
0	66.3	-	77.6	-
1	06.8	89.7	51.2	34.02
2	04.1	93.8	08.2	89.2
4	01.3	98.0	07.2	90.30
L.S.D. at 5%	02.8	-	3.78	-