

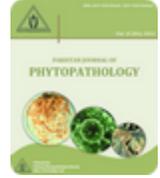


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EVALUATION OF DIFFERENT FUNGICIDES AGAINST DOWNY MILDEW OF CUCUMBER CAUSED BY *PSEUDOPERONOSPORA CUBENSIS*

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ABSTRACT

Cucumis sativus is one of the most important vegetable crop being grown in Pakistan, cucumber is being affected by different types of pathogens and downy mildew is one of the detrimental disease causing losses upto 40%. RCBD design was used for fungicide evaluation, Varieties viz., beithoalfa, Marketmore-76, Cucumber 363, Anmol, Marketmore and Desi were evaluated it was found that all varieties were showed positive response in minimizing disease disease out of which variety Beithoalfa showed the most effective control of disease followed by Marketmore-76, Cucumber 363, Anmol, Marketmore and Desi/Control. Among the treatment of fungicides: Moral fungicide showed most effective control of disease followed by Agrohut, Acute, Antracol, Cabriotop and Control, out of all fungicides "cabriotop" showed the least effective results against downy mildew disease.

Keywords: *Cucumis sativus*, downy mildew, chemical control

INTRODUCTION

Cucurbits are commercially important vegetable crops being grown all over the world. The continuous and intensive cultivation of these crops, along with different cultural practices; incidence and severity of a group of soil borne diseases have been increased such as vine declines (Bruton, 1998). Downy mildew disease was reported from 70 countries on species which belongs to *Cucumis* genus throughout the world (Cohen, 1981). Total area of world under cultivation of cucumber is 2.09 million hectares while the total production of cucumber is 0.31 million tones. No doubt cucumber is an important vine crop of Pakistan yet its yield is quite low. It was cultivated in Pakistan on area of 3397 ha with a total production of 142876 tones (FAO, 2011). The factors responsible for low yield of cucumber are diseases, cultivation of inferior varieties and lack of appropriate cultural practices and low standard varieties are also most common causes of low productivity is the cultivation of cucumber (Silva *et al.*, 1979). *P. cubensis* seems to be found rareley because it may overwinter as oospores on alternate hosts or on

countries with mild winter Sporangia of the *P. cubensis* may spread easily (Palti and Cohen, 1980). Downy mildew causes 40% losses for cucumber growers, so downy mildew is one of the destructive cucumber disease. (Colucci *et al.*, 2006). Among diseases of vegetable crops belonging to family cucurbitaceae *Pseudoperonospora cubensis* causing downy mildew is one of the most economically destructive and yield reducing disease of class oomycete (Lebeda and Cohen, 2011). For the purpose of protecting plant with increased yield and reducing downy mildew disease, it was found that significant fungicides having systemic action was introduced efficiently (Holmes and Ojiambo, 2009). low temperature to moderately high and hot days environment may help cucumber to resist/tolerate against the pathogen, although specified duration of hot periods of weather can suffocate disease spread (Lebeda and Widrlechner, 2003). *P. cubensis* has host range according to studies on its host range, It includes approximately 50species of 20 genera, From *Cucumis* genus 19 are the species which are its hosts (Lebeda and Widrlechner, 2003)

MATERIAL AND METHODS

Experiment was conducted during 2014 with Seven different varieties of cucumber viz., beithoalfa,

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Marketmore-76, Cucumber 363, Anmol , Marketmore and Desi in the field with three replications to identify fungicidal effect against downy mildew cucumber. The infected leaves were collected from cucumber field and it was stored at 4°C in refrigerator. In the laboratory, dislodge sporangia was collected from 6 severely infected leaves after soaking in distilled water and

rubbed gently with a glass rod. Haemocytometer was used for determining the spore suspension. In this way the suspension was adjusted as per requirement. Well dispersed solution of inoculum suspension was made while adding Tween 20 (0.06 g/L just before inoculation. Plants were then inoculated at initial seedling stage.

Table1. Detail of treatments employed in the experiment Name of Fungicides

Trade Name and Formulation	Chemical Name	Dose per litre of water
Control	-	-
Cabrio top 60% WDG	Metiram	2.0 gm
Antracol 70% WP	Dithiacarbomate	2.0 gm
Acute 50% SC	Azoxystrobin	2.5 ml
Agrohut 50% WP	Mancozeb+Dimethamorph	2.4 gm
Moral 50% WDG	Azoxystrobin	2.5 gm

In-vivo Evaluation of different fungicides on different varieties of cucumber against downy mildew:To study the fungicidal effect on different 6 varieties viz., beithoalfa, Marketmore-76, Cucumber 363, Anmol , Marketmore and Desi .Five fungicides such as Antracol,

Agrohut, Acute, Cabriotop and Moral were used. The experiment was conducted in Randomized Complete Block Design and factorial arrangement having three replications with a plot. Inoculum was sprayed on all 6 varieties before initiation of disease. Disease severity data was recorded.

Table-2 Grading of cucumber varieties against downy mildew disease.

Grade	%disease severity	Level of Resistance \ Susceptibility	No of varieties
0	No symptoms	completely resistant	Nil
1	0-3	disease highly resistant	Nil
2	3-6	disease highly resistant	Nil
3	6-12	disease moderately resistant	1
4	12-25	disease intermediate	Nil
5	25-50	disease intermediate	Nil
6	50-75	disease moderately susceptible	3
7	75-87	disease highly susceptible	2
8	87-94	disease highly susceptible	1
9	94-99	Plant dead	Nil

(Jenkins and Wehner, 1983).

STATISTICAL ANALYSIS

The data was analyzed statistically by employing the Fisher analysis of variance technique (Steel *et al.*, 1997) and treatment means were compared by using Least Significance Difference (LSD) test at 5% probability level (M. Stat C).

RESULTS AND DISCUSSION

Response of different varieties against downy mildew:As shown in the Figure 1 that all cucumber varieties of sprayed with fungicides showed different response of minimize the disease, Beithoalfa showed the most effective control of disease followed by Marketmore-76, Cucumber 363, Anmol, Marketmore and Desi/Control and laterly disease further reduced on Beithoalfa followed by Marketmore-76, Cucumber 363, Anmol, Marketmore and Desi/Control, all varieties

showed the positive response in minimizing disease after spray and significant statistical relationship was showed.

Effect of fungicide against downy mildew: As shown in the Figure 2 that different fungicides showed different response in regards to minimizing the effect of disease on cucumber, The fungicide Moral showed the most effective control of disease followed by Agrohut, Acute, Antracol, Cabriotop and Control and latterly also results of Moral were found most effective to control disease followed by Agrohut, Acute, Antracol Except Cabriotop all the fungicide showed the positive response in minimizing disease. On control variety disease incidence was maximum only fungicide Cabriotop showed the least effective results.

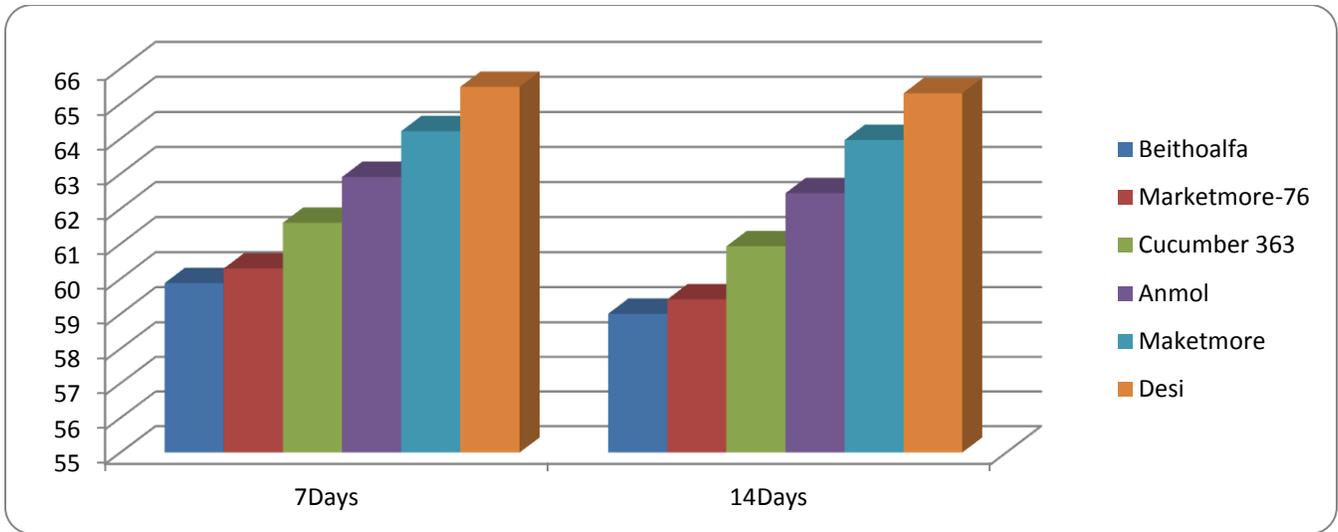


Figure 1. Response of cucumber varieties against downy mildew

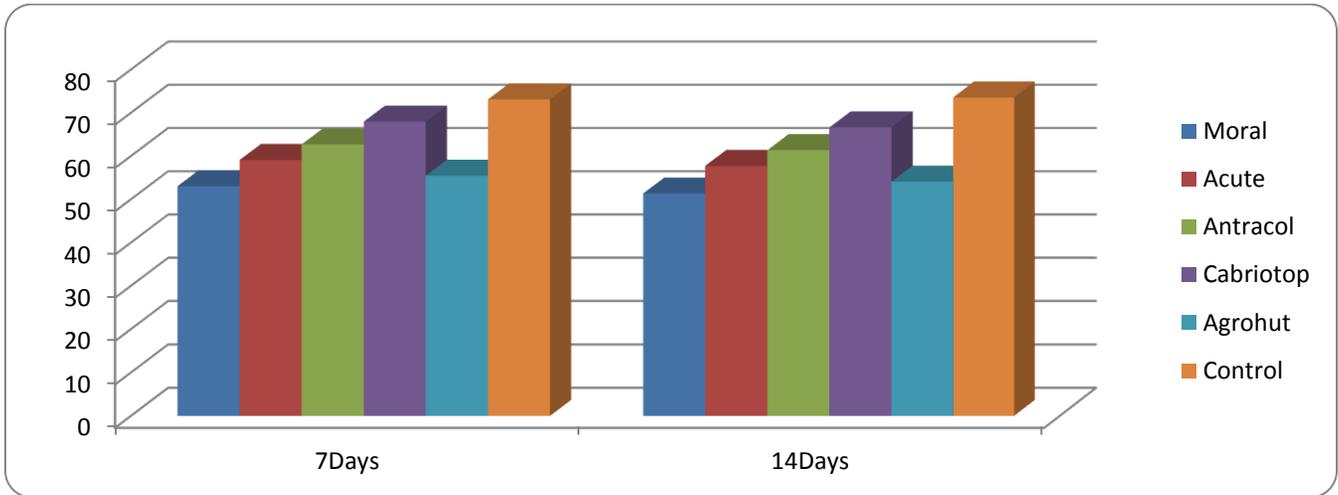


Figure 2. Effect of fungicide against downy mildew

Resistant cultivars use was not acceptable at commercial level so fungicides were used as in management strategy to achieve efficient result in minimizing downy mildew (Reuvini, 2003). The low incidence of the disease was recorded by the spray Ridomil (9%), Success (9%) And Alliet (11%) compared to control (78%). Length of fruit, Number of fruits per plant and fruit yield was significantly higher in Ridomil, Success and Alliet treated plots with compared to control and other fungicides treated plot (Chaudhry *et al.*, 2009). For the purpose of protecting plant with increased yield and reducing downy mildew it was found that significant fungicides having systemic action was introduced efficiently (Wang *et al.*, 2009). Fungicide efficiency improved if applied at the time when fungicide application was necessary, so timely application was a good effort, for helping growers to apply the initial

spray a disease forecast system is now available (Ojiambo *et al.*, 2011).

CONCLUSION

It is concluded that Moral showed the most effective control of disease on all varieties of cucumber followed by Agrohut, Acute, Antracol, Cabriotop and Control. And Cucumber variety Beithoalfa showed most efficient disease control response followed by Marketmore-76, Cucumber 363, Anmol, Marketmore and Desi/Control.

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