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VARIETAL REACTION AND CHEMICAL CONTROL OF CUCUMBER POWDERY MILDEW IN EGYPT

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Abstract

The reaction of four cucumber cultivars aganist *Erysiphe cichoracearum* DC., the causal pathogen of powdery mildew revealed that Beit Alpha cultivar was highly susceptible, while Amira was moderately susceptible. On the other hand, Medina was moderatley resistant while Sweet crunsh showed high resistance.

Fungicidal efficiency showed that karathane 48%, Anvil, Alto 100, Topas 100 and Afugan were the most effective fungicides against powdery mildew of cucumber while flowable sulphur, Benlate, Dorado and Sumi-eight were the least effective fungicides. Kema-Z and Bayfidan showed the lowest effect.

INTRODUCTION

Cucumber (*Cucumis sativus* L.) is one of the most economic vegetable crop grown in Egypt for both local consumption and exportation. During the last 10 years, the total cultivated area increased rapidly, especially in the new reclaimed lands as the prevailing environmental conditions are suitable for its growth. The cultivated area reached 43274 feddans in 1991.

Powdery mildew caused by *Erysiphe cichoracearum* DC., causes destructive losses when it attacks cucumber plants under Egyptian conditions, (Jagger *et al.* 1938, Pryor and Whitaker 1942 and Lashin 1969).

Several cucumber cultivars were tested to powdery mildew disease by different investigators. Smith (1948) mentioned that Puerto Rico-37 cucumber variety was resistant to powdery mildew. Helal *et al.* (1978) indicated that the cucumber variety Beit Alpha was highly susceptible, while Poinsett was highly resistant to the disease. Fadl *et al.* (1981) indicated that the lowest infection percentage was noted on Ashley and SMR No. 18 cucumber varieties. Ali (1984) reported that cucumber varieties Yomaki, Palmetto and Poinsett were considered highly resistant; PSR 30380 and Wanda were moderatley resistant, while Beit Alpha was highly susceptible and Amira variety was moderately susceptible.

Many workers studied chemical control of cucumber powdery mildew disease. Revilla (1955), Du Zeeuw (1958), Sidky and Estino (1961) and Kantzes and Gand (1962) controlled cucumber podery mildew with karathane. El-Sawah *et al.* (1970) found that crotothane, Morestan, Elosal and Karathane (wp) were effective against *E. cichoracearum* and increased the yield. Badlwin and Francis (1981) stated that Bayleton 25% gave excellent cucumber mildew control. Kolbe (1981) indicated that Bayleton (triadimefon) gave good control of *E. cichoracarum,* while Baycur (bitertanol) was also effective although sometimes, it gave slightly less effect. Ali (1984) reported that Vigilix, Rubigan 12%, Bayleton 25%, Benlate, Topsin M, Karathane, Saprol, Denmart and flowable sulphur decreasd infection percentage of cucumber powdery Mildew.

The major goal of this investigation is to throw lights on the varietal reaction of some recommended cucumber cultivars to powdery mildew disease as well as the evaluation of some new fungicides under field conditions since the fungicidal application is still the most effective method to control this disease.

MATERIALS AND METHODS

Reaction of four cucumber cultivars to E. cichoracearum :

Reaction of 4 cucumber cultivars, namely, Beit Alpha, Amira, Medina and Sweet crunsh to *E. cichoracearum*, the causal pathogen of cucumber powdery mildew

was studied. Field experiments were designed in completely randomized blocks with four replicates (4x4 m plot size), under natural infection, at Abo Khalifa, Ismailia Governorate. The trials were carried out at the beginning of May 1990 (Nili plantation). Seeds treated with Vitavax 300 (1.5 g/kg. seeds) from each cultivar were used. Disease assessment was estimated in leaf samples collected at random, 45 days after sowing as recommended by Townsend and Heuberger (1943).

Chemical control:

Eleven systemic and nonsystemic fungicides were evaluated for their efficiency to control powdery mildew under field conditions. The experiment was carried out during the two seasons 1990 and 1991 at Ismailia Governorate. Beit Alpha cultivar was used because of its high susceptibility. Complete randomized plot design (4x4 m) with five replicates was employed. Four sprays at 15 days interval, were applied during the season, starting 4 weeks after sowing. Control plots were sprayed with water. Infection percentages of powdery mildew were recorded after the 4th spray, under natural infection. Disease estimation was calculated according to Townsend and Heuberger (1943) as mentioned before and obtained data were analyzed statistically. The tested fungicides, their common names and their rates/100 L water were : *Alto 100* (Cyproconazol)-10 cc, *Topas 100* (Penconazol)-26 cc, *Anvil* (Hexaconazole)-25 cc, *Afugan* (Pyrazophos)-100 cc, *Bayfidan* (Triadimenol)-20 cc, *Dorado* (Pyrifenox)-10 cc, *Karathane* 48% (Denocap)-50 cc, *Flowable sulphur* (Sulphur)-250 cc, *Surni-eight* (Diniconazol)-35 cc, *Benlate* (Benomyl)-60 g and Kema Z (Carbendazim KZ)-70 g. Fungicidal efficiency was calculated according to the following formula :

$$\frac{\text{Infection in Control} - \text{Infection in Treatment}}{\text{Infection in Control}} \times 100$$

RESULTS AND DISCUSSION

Reaction of four cucumber cultivars to E. cichoracearum :

Data in Table 1 indicated that the four tested cucumber cultivars, used in this investigation, were susceptible to powdery mildew disease with various degree.

Beit Alpha cv. showed the highest infection percentage. Amira cv. was moderately susceplible, while Medina cv. was moderately resistant. Sweet crunsh cv. was the highly resistant cultivar. These results were in agreement with Helal *et al.* (1978) and Ali (1984).

Varations between the tested cultivars with respect to their reaction to the causal pathogen of cucumber powdery mildew may be due to their morphological and anatomical as well as their chemical components (Fomin and Rundaeva 1964), or due to their genetic properties (Barnes 1961; Kooistra 1967; Imam *et al.* 1975).

Table 1 : Reaction of four cucumber cultivars to powdery mildew disease 45 days after sowing.

Cultivars	% of infection
Beit Alpha	57.8
Amira	42.9
Medina	21.6
Sweet crunsh	4.6
L.S.D. 5%	4.89

Fomin and Rundaeva (1964) attributed the immunity of a wild cucumber form to the anatomical structure of the leaf, while some other cultivated varieties showed a relative immunity which depended upon the physiological characteristies of the variety.Varietal reaction is considered the most important means in constructing an integrated disease control approach. Therefore, varieties having marked levels of resistance should be seriously considered by the breeders as well as the pathologists.

Chemical control :

These trials were carried out during two successive years (1990 and 1991)

at Abo Khalifa locality, Ismailia Governorate. Data in Table (2) showed significant differences among tested fungicides and control treatment.

Mean percent of infected leaf surface and fungicidal efficiency revealed that Karathane 48%, Anvil, Alto 100, Topas 100 and Afugan were the most effective against powdery mildew of cucumber. This result was in accordance with several authors (Sidky and Estino 1961, El-Sawah *et al.* 1970 and Ali 1984). Flowable sulphur, Benlate, Dorado and Sumi-eight were moderately effective, while Kema Z and Bayfidan were the least effective fungicides (Table 2).

Table 2 : Effect of 11 systemic and non-systemic fungicides against E. cichoracearum, during the two successive seasons 1990 and 1991.

Fungicides	% infected leaf surface				Mean	Fungicidal efficiency (%)
	1990	Fungicidal efficiency (%)	1991	Fungicidal efficiency (%)		
Karathane 48%	7.81	78.78	10.34	78.59	9.07	78.66
Anvil	8.04	78.15	11.14	76.94	9.59	77.43
Alto 100	10.14	72.45	9.26	80.83	9.70	77.18
Topas 100	10.16	72.39	10.45	78.36	10.30	75.76
Afugan	11.26	69.40	10.50	78.26	10.88	74.40
Flowable sulphur	14.25	61.28	15.86	67.16	15.05	64.59
Benlate	15.08	59.02	16.01	66.85	15.54	63.43
Dorado	16.89	54.10	17.91	62.92	17.40	59.06
Sumi-eight	16.04	56.41	19.43	59.77	17.73	58.28
Kema Z	19.54	46.90	21.03	56.46	20.28	52.28
Bayfidan	22.30	39.40	24.61	49.05	23.45	44.82
Control	36.8		48.30		42.5	
L.S.D. 5%	2.16		4.18			

In general, the results revealed that, the use of Sweet crunsh or Medina cultivars as the most resistant cultivars against powdery mildew of cucumber in addition to spraying with karathane 48%, or Anvil or Alto 100 or Topas 100 at 15 days

vals starting 4 weeks after sowing is the most effective to control this serious disease.

REFERENCES

1. Ali, I.N. 1984. Pathological studies on powdery mildew of cucurbits in A.R.E.- Ph. D. Thesis, Fac. of Agric. Suez Canal Univ.
2. Badlwin, R.E. and J.A. Francis. 1981. Control of powdery mildew and anthracnose on cucumber. Amer. Phytopath. Soc., Fungicide and Nematocide Test, 37 :67.
3. Barnes, W.C. 1961. Multiple disease resistant cucumber. Proc. Amr. Soc. Hort. Sci., 71 : 417-423.
4. Du Zeeuw. 1958. Cucurbit powdery mildew fungicide trials, 1956-75. Quart. Mich. Agric. Exp. Sta. Bull. 40.
5. El-Sawah, M.Y., F.A. Fadl and M.S. Hassan. 1970. Studies on powdery mildew of squash. Agric. Res. Rev. ARE, 48 : 28-37.
6. Fadl, F.A., M.S. Abdel Moneim, A. El-Shami, M.S. Hassan, I. Nagy and W.R. Rizkalla. 1981. Chemical control and varietal reaction to cucumber powdery mildew. Res. Bull. No. 289, Zagazig Univ.
7. Fomin, E.E. and V.M. Rundaeva. 1964. The problem of the biology of the causal agent of powdery mildew of cucumber and the immunity of varieties to the disease. Sci. Trans. Har'kov. Agric. Inst., 43 : 214-218. (c.f. PL. Breeding Abst. 5790, 1969).
8. Helal, R.M., H.S. Zaki and F.A. Fadl. 1978. Physiological studies on the nature of resistance to powdery mildew in cucumber. Res. Bull. 953. Ain Shams Univ.
9. Imam, M.K., M.A. Abobakr and H. Morkos. 1975. Inheritance of resistance to powdery mildew in cucumber (*Cucumis sativus* L.). Egyptian J. Genetic and Cytology , 4 (2) : 475.
10. Jagger, I.C., T.W. Whitaker and D.R. Porter. 1938. A new biological form of powdery mildew on muskmelons in the Imperial Valley of California. Plant Dis. Reptr., 22 : 275-276.
11. Kantzes, J. and U.A Gand. 1962. Powdery mildew of cucumber. Fungicides and Nematocides, Results of 1962. 18 : 59 pp.
12. Kolbe, W. 1981. Trials for the control of powdery mildew on field-grown cu-

cumber varieties with Baycor and Bayleton (1975-1981). Pflanzenschutz-Nachrichten, Bayer 34 (1) : 80-84. (c.f. Rev. PL. Path. 1983 Vol. 62 (7) 75).

13. Kooistra, E. 1967. Mildew resistance in cucumber. Zaadbelangen, 21 : 270-272. (c.f. PL. Breeding Abst. 5510, 1968).
14. Lashin, S.M.A. 1969. Studies on the fungus Erysiphe cichoracearum DC. causing powdery mildew of squash. M. Sc. Thesis Fac. Agric. Ain Shams Univ., 108 pp.
15. Pryor, D.E. and T.W. Whitaker. 1942. The reaction of cantaloupe strains to powdery mildew. Phytopathology, 32 : 995-1004.
16. Revilla, G.K. 1955. Control of powdery mildew on melon, pumpkin and cucumber. Bol. Estac. Exp. Agric. La Moina 60. (c.f. Rev. Appl. Mycol. 36 : 164, 1957).
17. Sidky, S.T. and M.N. Estino. 1961. The control of powdery mildew of cucurbits with fungicides. 1st Arab conference of Horticulture, 4 : 1737, 1965 (in Arabic).
18. Smith, P.G. 1948. Powdery mildew resistance in cucumber. Phytopathology, 38 : 1027-1028.
19. Townsend, G.R. and J.W. Heuberger. 1943. Methods for estimating losses caused by diseases in fungicide experiments. PL. Dis. Reptr., 27 : 340-343.

رد فعل الأصناف والمقاومة الكيميائية للبياض الدقيقى على الخيار فى مصر

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أظهرت دراسة رد فعل أربعة أصناف من الخيار للفطر أريسيفى سيكوريسيرم المسبب لمرض البياض الدقيقى أن الصنف بيت ألفا كان شديد القابلية للإصابة بينما كان الصنف أميرة متوسط القابلية . ومن جهة أخرى كان الصنف مدينا متوسط المقاومة بينما أظهر الصنف سويت كرنش مقاومة عالية.

كما اتضح من اختبار المبيدات الفطرية فى مقاومة المرض أن المواد كاراثين ٤٨٪ – أنفيل – ألتو ١٠٠ – توباس ١٠٠ – أفيوجان بالمعدلات المختبرة كانت أكثر المواد تأثيراً ضد مرض البياض الدقيقى على الخيار فى حين كانت المواد : كبريت فلوابل – بنليت – دورادو – سومى آيت أقل فاعلية . وقد أعطت مادتى بايفيدان و كيمازد أقل تأثيراً فى مقاومة المرض .