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Research Article

EFFECT OF PHYSICAL FACTORS ON FUNGI CAUSING CROWN ROT OF BANANA

Shama Mahadik

Department of Botany, Ramkrishna Paramhansa Mahavidyalaya, Osmanabad 413501(MS)

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ABSTRACT

Banana is a most popular fruit due to its nutritive value. During storage and marketing banana deteriorate through microbial attack. A survey of post harvest diseases of banana was carried from different localities of Maharashtra. Predominant disease was crown rot. In fungal pathogens *Fusariumoxysporum* was very common. Fungicide application programme has influenced resistance in pathogens. Some of the isolates of *Fusariumoxysporum* were sensitive to benomyl whereas others were resistant. Physical factors influence the growth of fungi. It was seen that growth of resistant isolate was higher than sensitive one.

INTRODUCTION

Banana (Musa paradisiac L.) fruit is one of the most important commercialfruit. Banana is a popular fruit due to its nutritive value. It is the cheapest source of carbohydrates, rich in vitamins particularly vitamin B. It is also a good source of K,P,Ca and Mg. At the stage of storage and marketing banana suffers from many diseases. Mostly in storage banana are deteriorated by fungal pathogens Earlier reports indicate that there are 106 post harvest diseases of banana from different parts of the world. (Bilgrami, 1976, Knight 1982, Harnandez, 1984). Among these crown rot caused by *Fusariumoxysporum* is very common. Number of fungicidal and chemical compounds belonging to different trades have been tried to manage these diseases. Among the fungicides benzimidazoles have been commonly used. However this group of fungicides are known to cause resistance in the pathogen because of their wide use in management of many diseases of various crops. Present paper deals with the effect of physical factors on benomyl sensitive and resistant *Fusariumoxysporum* causing crown rot of banana.

MATERIAL AND METHODS

The diseased samples of banana were collected from localities/markets in Maharashtra state. The pathogen *Fusariumoxysporum* was isolated from the infected tissue by using CzapekDox agar medium. Sensitivity of the isolates against benomyl was determined by food poisoning test .Induction of benomyl resistance was also done by treating spores through UV and EMS. Horsten (1979). EMS 4 strain was used for further study. (Gangawane and Shaikh 1988). Various temperatures were arranged in BOD incubator The pathogen was inoculated at centreon CzapekDox agar medium. These agar plates were placed in incubator at different temperatures for a week. The growth was recorded every day. The CzepekDox agar medium was adjusted to different pHby adding 0.1N HCL and 0.1N NaOH. The pathogen was inoculated at the centre of the agar plates. The plates were incubated and growth was recorded every day up to a week.For different light sources the coloured polythene sheets were covered to petriplates containing CzapekDox agar medium inoculated with resistant and sensitive isolate .Growth was recorded every day up to a week.

RESULT AND DISCUSSION

Effect of pH

Both the sensitive (FO6) and resistant (EMS FO4) were cultured on CzapekDox medium at different pH levels. The pH was adjusted with 1N HCL and 1N NaOH. Results indicate that (Table No 1) growth of the resistant mutant was always higher than that of the sensitive isolate at all pH levels pH 5 appeared to be more favorable for the growth of both strains. Growth was reduced below and higher pH levels in both the cases.

Corresponding author:* **Shama Mahadik
Department of Botany, Ramkrishna Paramhansa Mahavidyalaya, Osmanabad 413501(MS)

Table 1 Effect of different pH on the linear growth (mm) of *Fusariumoxysporum* isolates sensitive and resistant to benomyl on CzapekDox agar medium

Sr.No.	pH levels	Sensitive (Fo6) Days							Resistant (EMS FO4) Days						
		3	4	5	6	7	8	Average	3	4	5	6	7	8	Average
1	3	10	12	16	20	22	22	17.0	15	30	35	42	46	52	36.6
2	4	11	13	15	21	22	26	18.0	16	22	38	45	55	60	39.3
3	5	10	14	20	28	35	45	25.3	18	25	36	52	62	75	44.6
4	6	12	16	25	35	38	40	27.6	14	20	32	40	55	65	37.6
5	7	10	18	26	32	38	42	27.6	15	22	38	46	50	55	37.6
6	8	11	20	25	35	35	35	26.8	10	22	32	36	40	40	30.O

C.D.P0.05=3.97 C.D0.05=3.97
P 0.01= 6.56
P 0.01 = 7.96

Effect of Temperature

The plates were incubated at temperature ranging from 5 to 45 C. Again the growth was found to be higher in case of resistant mutant at different temperatures (Table No2) .The temperature 25 to 35 C was appeared to be favorable for the growth of both strains. However sensitive isolate showed its higher growth at 35 C and resistant mutant showed its higher growth at 25 C. Temperatures 5 C and 45 C were found to be unfavorable for growth of both the strains.

Table 2 Effect of tempareture on the linear growth (mm) of *Fusariumoxysporum* isolates sensitive and resistant to benomyl on CzapekDox agar medium.

Sr.No.	Temp C	Sensitive (Fo6) Days							Resistant (EMS FO4) Days						
		3	4	5	6	7	8	Average	3	4	5	6	7	8	Average
1	5	6	8	9	9	11	11	9	6	8	10	10	11	12	9.5
2	10	9	13	14	16	16	17	14.1	10	12	16	16	18	20	15.3
3	25	10	15	24	30	32	35	24.3	18	32	38	41	52	62	40.5
4	35	12	20	30	35	45	55	27.0	20	22	35	42	55	60	39.3
5	45	4	6	6	8	8	8	6.0	7	8	8	9	9	9	8.3

C.D.P0.05=6.13
C.D0.05=7.38 P 0.01= 10.13
P 0.01 = 12.19

Effect of light spectra

Plates were covered with different colour gelatin papers and incubated for 8 days. Here also (Table No.3) growth of resistant mutant was higher than the benomyl sensitive isolate. There was quite large variation in the growth of both strains under different light spectra. The growth of sensitive isolate was maximum under the red light spectra while growth of the resistant mutant was higher under red, green and yellow light spectra.

Table 3 Effect of different light spectra on the linear growth (mm) of *Fusariumoxysporum* isolates sensitive and resistant to benomyl on CzapekDox agar medium

Sr.No.	Light Spectra	Sensitive (Fo6) Days							Resistant (EMS FO4) Days						
		3	4	5	6	7	8	Average	3	4	5	6	7	8	Average
1	Normal	12	20	30	35	38	45	30.0	18	32	38	41	52	65	41.0
2	Red	12	18	20	24	25	30	21.5	18	30	35	50	62	70	44.1
3	Green	10	12	14	20	25	28	18.1	17	32	40	45	60	68	43.6
4	Yellow	10	12	16	18	20	22	16.3	18	20	45	50	65	68	44.3
5	Blue	10	12	16	20	22	32	18.6	20	25	38	42	60	72	42.8

C.D.P0.05=3.00
C.D0.05=3.00 P 0.01=4.95
P 0.01 =6.17

CONCLUSION

Crown rot of banana was a major post harvest disease and *Fusariumoxysporum* was prevalent in fungal pathogens. Temperatures 5 C and 45 C were found to be unfavorable for growth of both the strains. pH 5 appeared to be more favorable for the growth of both strains. Growth was reduced below and higher pH levels in both the cases. Sensitive isolate showed maximum growth in red spectra while growth of the resistant mutant was higher under red, green and yellow light spectra.

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