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Growth and Sporulation of Red rot Pathogen on Sugarcane Juice media

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ABSTRACT

An experiment was conducted to study the radial growth and sporulation of red rot organism in sugarcane juice media. Ten sugarcane clones, such as, Isd. 16, Isd. 17, L. Jaba-C, Isd. 5/55, BO. 70, Nagarbari, Isd 18, Isd. 20, I. 258/77 and I. 147/77 were studied. The radial growth and sporulation of red rot organism in different media prepared with the juice of different clones were found to differ significantly. There was no relation between the radial growth and spore concentration except in the clones I. 147/77, BO. 70, Isd. 17 and Isd. 20. The clone I. 147/77 showed the lowest radial growth (0.58 cm) and the lowest spore concentration (0.5×10^7).

INTRODUCTION

Colletotrichum falcatum Went, the causal organism of red rot of sugarcane is the imperfect stage of *Glomerella tucumanesis* Arx & Muller. The species was first described in Java and since then it has been reported to be present in almost all the cane growing countries of the world (Singh and Kamal, 1979). Abbott (1938) reported that the presence of phenolic substances is relatively greater in varieties resistant to red rot than in those which are susceptible. Thus it indicates that the influence of the host extracts on the growth and sporulation of the pathogen in virto may have relation to host reaction to the disease in vivo. Tilak (1968) demonstrated that conidial germination was influenced by the juice obtained from the resistant and susceptible genotypes of sugarcane. Germination was less in the juice of the resistant varieties as compared to the susceptible ones. In the light of references cited above, the experiment was undertaken as it was assumed that the reaction of different clones can also be assessed in the field on the basis of the growth and sporulation of *Colletotrichum falcatum* on media prepared from juice of different sugarcane clones in vitro.

MATERIALS AND METHODS

Ten sugarcane clones, namely, Isd. 16, Isd. 17, L. Jaba-C, Isd. 5/55, BO. 70, Nagarbari, Isd. 18, Isd. 20, I. 258/77 and I.147/77 were selected. To prepare culture media, juice from each clone was extracted from middle portion of 8 to 9 month old cane stalks and it was prepared in the proportion of 1 : 50 agar and juice. The medium was then sterilized and 15 ml media was poured per plate and culturing was done with the inoculum of *Colletotrichum falcatum* at 28°C ± 1 in five replicated plates for each clone. Data were taken on radial colony growth (cm) at 2 d interval upto 10 d finally to assess the radial colony growth/day. The spore concentration was measured on 23 d old culture. In case of control, agar medium was prepared using simply water and inoculum was transferred to this medium. For measuring spore concentration of each plate, the entire culture of a plate was mixed by a high speed mixer machine in 1000 ml sterilized water. The water was added in two instalments of 500 ml. In each time high speed of the mixer machine was maintained for 30 seconds during addition of water.

After stiring for one minute a drop of water was taken from the mixer and then spores were observed in each square of the haemacytometer. Ten readings were taken from each of the five replicated plates of each clone and mean spore concentration was calculated out. Data on radial growth and spore concentration were then analysed statistically.

RESULTS AND DISCUSSION

Lowest colony growth of fungus were observed in the clones I. 147/77 (0.58 cm) and Isd. 16 (0.58 cm) (Table 1). There was no significant difference among the radial growth of Isd. 16 (0.58 cm), I. 147/77 (0.58 cm) and BO. 70 (0.61 cm) which were significantly lower than the radial growth of the rest clones except control. The clone Isd. 18 (0.67 cm) showed significantly lower radial growth than that of the rest except the clones Isd. 16, I. 147/77 and BO. 70. The clone Isd. 5/55 (0.80 cm) showed significantly lower radial growth than that of the clones Isd. 20 (0.85 cm) and I. 258/77 (0.86 cm) except L. Jaba-C (0.84 cm). There was no significant difference among the radial growth of the clones L. Jaba-C, I. 258/77 and Isd. 20.

The clone I. 147/77 (0.5×10^7) showed the lowest spore concentration which had no significant difference from that of the clones Nagarbari (1.1×10^7), BO. 70 (1.2×10^7) and Isd. 5/55 (1.2×10^7) which were significantly lower than the rest clones except I. 258/77 (1.6×10^7) and L. Jaba-C (2.2×10^7) (Table I). There was no significant difference among the spore concentrations of I. 258/77 (1.6×10^7), L. Jaba-C (2.2×10^7), Isd. 18 (2.9×10^7), Isd. 17 (2.9×10^7) and Isd. 16 (3.0×10^7). The spore concentrations of the clones Isd. 18, Isd. 17 and Isd. 16 were significantly lower than that of the clone I. 354/77 (6.9×10^7). It is evident from the Table 1 that there was no relation between the redial growth and spore concentration except in the clones I. 147/77, BO. 70, Isd. 17 and Isd. 20. The clone I. 147/77 showed the lowest radial growth and spore concentration. Tilak (1968) concluded that conidial germination was less in the juice of

Table 1. Radial growth and sporulation of red rot pathogen on sugarcane juice media.

Clones	Radial growth (cm)							Mean sporulation (spores/plate)**
	2nd day	4th day	6th day	8th day	10th day	Total	Mean	
Isd. 17	0.92	1.14	1.54	2.18	1.56	7.34	0.73 d*	2.9×10^7 de
L. Jaba-C.	1.04	1.98	2.22	2.08	1.12	8.44	0.84 ef	2.2×10^7 cd
Nagarbari	0.86	1.28	1.54	1.68	1.82	7.18	0.72 d	1.1×10^7 bc
Isd. 18	0.68	1.32	1.66	1.48	1.52	6.66	0.67 c	2.9×10^7 de
Isd. 20	1.02	3.00	2.72	1.48	0.24	8.46	0.85 f	6.9×10^7 f
I. 258/77	1.08	2.96	2.82	1.40	0.36	8.62	0.86 f	1.6×10^7 cd
I. 147/77	0.68	1.08	1.16	1.38	1.46	5.76	0.58 b	0.5×10^7 b
Isd. 16	0.48	1.12	1.04	1.40	1.74	5.78	0.58 b	3.0×10^7 de
B.O. 70	0.78	1.28	1.24	1.28	1.50	6.08	0.61 b	1.2×10^7 bc
Isd. 5/55	1.12	1.48	1.74	2.00	1.64	7.98	0.80 e	1.2×10^7 bc
Control	0	0	0	0	0	0	0a	0a

* Means followed by same letter do not differ significantly as per DNMR tests.

** The spore count was taken on the 23rd day of transferring inoculum to the culture medium.

the resistant clones due to higher level of phenolic substances compared to the susceptible clones which contained lower level of phenolic substances in juice. So here it can be assumed that the clones used in the present experiment contained different levels of phenolic compound which might be higher in the clone I 147/77. Radial growth and spore concentration were different in the media prepared using juice from different clones showing varietal differences/ response against red rot organism. It has been further reported that sugarcane juice influences conidial germination of *Colletotrichum falcatum* (Tilak, 1968). Therefore, the present results suggest to determine the level of phenolic substances in the juice of different clones and their behaviour against red rot organism.

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