Effect of Different Ph Regimes on the Growth and Micro-Sclerotial Formation on *Phoma. Tropica*

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Abstract— *Investigation on leaf spot (Phoma tropica) first time report from Indian bean (Lablab purpureus L.) under south Gujarat condition. Investigation was carried out in the Department of Plant Pathology, Navsari Agricultural University, Navsari to find out suitable pH regimes for physiological requirement of the pathogen. The fungus could grow at all the levels of pH tested, but growth and micro-sclerotial production were significantly better in acid medium as compared to alkaline, pH 6.0 appeared to be the optimum.*

Keywords— Lablab purpureus, Phoma tropica, pH.

I. INTRODUCTION

Indian bean is one of the important pulse cum vegetable crop of India. Leaf spot [Phoma tropica Schneider and Boerema] disease of Indian bean has become a major problem in recent past with a threat to successful and profitable cultivation in south Gujarat. Looking to the seriousness of the disease and economic importance of the crop in this area, present investigations were under taken to study the behaviour of the disease and to generate necessary information like to find out suitable pH regimes and which pH is useful for growth inhibition and micro-sclorotial production invitro to know the physiological requirement of pathogen.

II. MATERIALS AND METHODS

Physiological point of view Richards' synthetic medium was found superior and standard medium for other physiological investigation. The pH of the medium was adjusted in the range of 4.0, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, and 8.0 using 0.1 N HCl and 0.1 N NaOH with the help of Backman's pH meter.

Fifty ml of the liquid medium was filled in each 150 ml corning conical flask and flasks were plugged with non-absorbent cotton and were sterilized at 1.2 kg cm-2 pressure for 20 minutes in an autoclave. The flasks were inoculated aseptically by placing 5 mm diameter culture block, cut aseptically with the help of cork borer from 7 days old pure culture of Phoma tropica. Three repetitions for recording growth and fourth repetition for recording microsclerotial count were maintained in each case. The flasks were incubated at 27 + 2˚C temperature. After 15 days of inoculation mycelial mats were harvested on previously weighed oven dried Whatman's filter paper No. 42, giving sufficient washing with warm distilled water. The filter papers with mycelial mats were dried in an oven at 60˚C till constant weight was obtained.

The observations were recorded to compare the dry mycelial weight. The microsclerotia count was recorded from fourth repetition. At the end of incubation period, the whole mycelial substrate was homogenized in 50 ml distilled sterilized water with the help of Sumeet homogenizer. The homogenate was filtered through muslin cloth. A drop of suspension was examined under low power magnification (10 X) microscope. The number of microsclerotia per microscopic field under were recorded from four randomly selected microscopic fields in each case. The sclerotial count was grouped as: - =No; + = 10-20; ++ = 21-30; and +++ = above 30 sclerotia per microscopic field in respect of the sclerotial number (Das, 1988).

III. RESULTS AND DISCUSSION

The Richards' broth medium was taken as a basal medium in this study. The dry mycelial weight, micro-sclerotial production and a drift in pH after mycelial harvesting were recorded. The data were statistically analysed and presented in Table- 4.7. The results clearly indicated that the fungus could grow and produce micro-sclerotia in a wide pH range i.e. 4.0 to 8.0 pH. Dry mycelial weight was significantly higher at pH 6.0 (643.00 mg), which was at par with pH 6.5 (638.33 mg). The next best in order of merit was pH 7.0 (391.00 mg) which was at par with pH 5.5 (381.00) followed by pH 7.5 (351.00 mg) which was at par with pH 5.0 (345.33 mg) and pH 4.0 (261.00 mg). The poor growth of the fungus was recorded at pH 8.0 (227.00 mg).

IV. TABLE-1: EFFECT OF DIFFERENT pH REGIMES ON GROWTH AND MICRO-SCLEROTIAL FORMATION BY P. *TROPICA*

Sr. No.	pH	Av. dry mycelial weight (mg)	Micro-sclerotial formation	Filtrate pH
1	4.0	2.41*(261.00)**	+	3.43
2	5.0	2.53 (345.33)	++	4.20
3	5.5	2.58 (381.00)	++	5.10
4	6.0	2.80 (643.00)	+++	5.53
5	6.5	2.80(638.33)	+++	6.23
6	7.0	2.59(391.00)	+++	6.97
7	7.5	2.54(351.00)	++	7.21
8	8.0	2.35(227.00)	+	7.93
	S. Em. ±	0.0007		
	C.D. at 5%	0.0021		
	C.V. %	0.05		

* Figures indicate log + 0 transformed values

** Figures in parentheses indicate retransformed values

\+ Microsclerotial formation (no. of microsclerotia per microscopic field)

The micro-sclerotial formation was of highest level at pH 6.0, pH 6.5 and pH 7.0. It was of medium level at pH 5.0, pH 5.5 and pH 7.5 and of low level at pH 4.0 and pH 8.0.

This study clearly indicated growth and micro-sclerotia production showed increasing trend by P. tropica with an increase in pH up to 6.5 and thereafter it declined. The optimum pH for pathogen growth proved to be pH 6.0. It was also found that medium near acidic was more preferred by the fungus for the growth and micro-sclerotial production as compared to alkaline medium. The present findings tallied with those of Kumar (2006) who reported best mycelial weight of M. phaseolina at pH 6.5 the next best in order of merit was pH 6.0 followed by pH 5.5 and highest level of micro-sclerotial formation occurred at pH 6.5, 5.5, 5.0 and pH 4.0. Sharma et al. (2004) reported the highest mycelial growth and micro-sclerotial formation of four isolates of M. phaseolina at pH 6.5 to 7.0. Chang (1985) reported best mycelial growth and sclerotial formation of R. solani at pH 7.0.

V. CONCLUSION

Results showed that the fungus could grow at all the levels of pH tested, growth and microsclerotial production were significantly superior in acidic medium as compared to alkaline, pH 6.0 appeared to be the optimum for growth and microsclerotial production.

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