

Original Research Article

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## Effect of pH & Media on Mycelial Growth of *Curvularia spicifera* causing *Curvularia* Leaf Spot of Tomato in Manipur

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### ABSTRACT

#### Keywords

*Curvularia spicifera*  
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Tomato (*Solanum lycopersicum* Mill.) is one of the most remunerative and widely grown vegetables in the world. The area under tomato cultivation in Manipur accounts for about 0.15 million hectares with an average production of 2.10 million tonnes and productivity of 12.02 tonnes ha<sup>-1</sup> during 2016-17. Present research was carried out to study the effect of different culture media and pH on mycelia growth of *Curvularia spicifera*. Among seven culture media that were tested, the fungus grew best on Coon's media, Oat Meal Agar and Richards agar. The most suitable pH for growth of fungus was 10 and 8.0.

### Introduction

Tomato (*Solanum lycopersicum* Mill.) is one of the most remunerative and widely grown vegetables in the world. It is an annual crop belonging to the family Solanaceae and native of "South America" (Sabina 1819). Tomato holds second rank next to potato in world acreage although it is first among processing crops. Tomato is also known for high medicinal value and nutritional values. The pulp and juice are digestible, promoter of gastric secretion and blood purifier. Tomato is grown for its edible fruits, which can be consumed either fresh or in the form of

various processed products such as paste, powder, ketchup, sauce, soup and canned whole fruits

In Manipur state it is cultivated between November to May. It occupies an area of 0.15 million hectares with the production of 2.10 million tonnes and productivity of 12.02 tonnes ha<sup>-1</sup> during 2016-17 ((NHB database 2013).

Dhingra (1982) studied *Curvularia epennigeti* and found that maximum growth and sporulation of the fungus on Richard's medium. As obvious, in the present study

also, Richard's medium supported maximum mycelial growth of *Curvularia lunata* var. *aeria*.

Agarwal (1958) observed that the pathogen *Curvularia penniseti* grew well in range of 4.4 to 7.8 Mathur *et al.*, (1960) reported the optimum pH range between 4.4 and 7.8 for the growth of *Curvularia lunata*. Singh (1972) recorded maximum spore germination in *C. lunata* var. *aeria* at pH 6.0. Adisa (1983) found optimum pH between 6 to 8 for the growth of *C. verruculosaca* using fruit rot of pineapple. Further, in 1985, he reported optimum mycelial production of *C. paradoxa* and *C. verruculosa* at pH 6.0 and 7.0 respectively. Singh (1987) found maximum infection by *Curvularia* spp at pH 5.0 to 6.0.

## Materials and Methods

### Isolation of fungus

*Curvularia* leaf spot infected tomato plant samples were collected from farmer's field of different locations and isolation, identification of the causal pathogen was carried out in the Department of Plant Pathology, College of Agriculture, CAU, Imphal. Diseased samples were lacerated to small pieces with the help of sterilized scalpel. The lacerated pieces were surface sterilized using 1% sodium hypochlorite solution for 1 minute followed by rinsing the pieces in three phases of sterile distilled water in order to remove the traces of sodium hypochlorite. Later the pieces were blot dried using blotting paper.

The sterile pieces were aseptically transferred to sterilized petri dishes containing Potato dextrose agar (PDA). The petri dishes were incubated at  $27 \pm 1^\circ\text{C}$  in BOD incubator and were observed periodically for the fungal growth. Purified cultures of the fungus were obtained by hyphal tip culture methods. Identification was done according to the key of (Leslie and Summerell, 2006)

### Effect of different culture media on mycelial growth of *Curvularia spicifera*

Asserting suitable medium for mycelial growth formation of *Curvularia spicifera*, different media for culturing were taken under *in-vitro* study. Three replications for each medium were maintained. Different media like coon's medium, corn meal agar medium, Elliots Agar, Oat Meal Agar, Potato Dextrose Agar, Richards Agar, Water Agar were used. The mycelial growth of the fungus was studied and the data was statistically analyzed.

### Effect of different pH on mycelial growth of *Curvularia spicifera*

To estimate the mycelial growth of the *Curvularia spicifera* at different pH levels, 20ml of potato dextrose broth was taken in 150ml conical flasks. Then the pH of the medium was altered by using 1N HCl and 1N NaOH to acidic and basic respectively and the pH was checked by pH meter and sterilized at 1.1kg/cm<sup>2</sup> of pressure for 20 min.

The sterilized broth flasks were then inoculated with 5mm disc of 4 days old culture and were incubated at room temperature for 10 days. Three replications of each pH were maintained and weighed was measured as per procedure data was analysed statistically.

## Results and Discussion

### Effect of different culture media on mycelial growth of *Curvularia spicifera*

*Curvularia spicifera* showed highest maximum radial growth in coons medium 93.75mm, oat meal agar showed 78.12mm, Richard agar showed 67.50mm, Elliots agar and corn meal showed 56.56 and 53.21mm, PDA showed 44.37mm. lowest radial growth was observed in water agar showed

35.62mm. Coons medium showed smooth growth with regular shape light colour, corn meal showed light ash colour with regular shape, Elliot's agar showed regular shape with smooth rings, oat meal agar showed soft transparent thick colour growth, PDA showed irregular shape, Richards agar showed thick colour with white margin and water agar showed low transparent growth these results are found to be similar with Dhingra (1982) studied *Curvularia pennigeti* and found that maximum growth and sporulation of the fungus on Richard's medium. As obvious, in the present study also, Richard's medium supported maximum mycelial growth of *Curvularia lunata var. aerea* (Table 1).

**Effect of different pH on growth of *Curvularia spicifera* on PDA**

*Curvularia spicifera* showed Highest growth at pH 10 (88.12%), pH 9, pH 8 and pH 7 showed 85.62, 83.12 and 79.06%, pH 6 showed 70.31%. lowest growth was showed at pH 5 (60.31%) these results are found to be similar with Agarwal (1958) observed that the pathogen *Curvularia penniseti* grew well in range of 4.4 to 7.8 Mathur *et al.*, (1960) reported the optimum pH range between 4.4 to 7.8 for the growth of *Curvularia lunata* (Table 2).

**Table.1** Effect of different culture media on radial growth of *Curvularia spicifera*

Culture media	<i>Curvularia spicifera</i>
Coons media	93.75
Corn meal	53.21
Elliot's Agar	56.56
Oat Meal Agar	78.12
PDA	44.37
Richards agar	67.55
Water Agar	35.62
SE(d)±	0.32
CD(0.05)	0.97

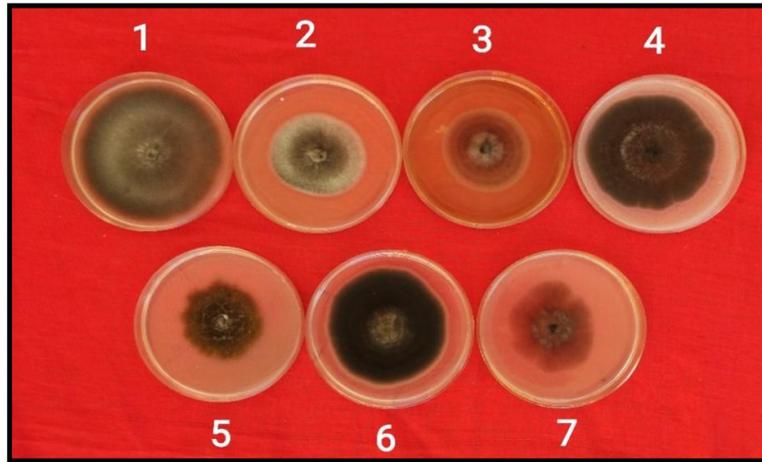
\*Mean of three replications

**Table.2** Effect of different pH on growth of *Curvularia spicifera* on PDA

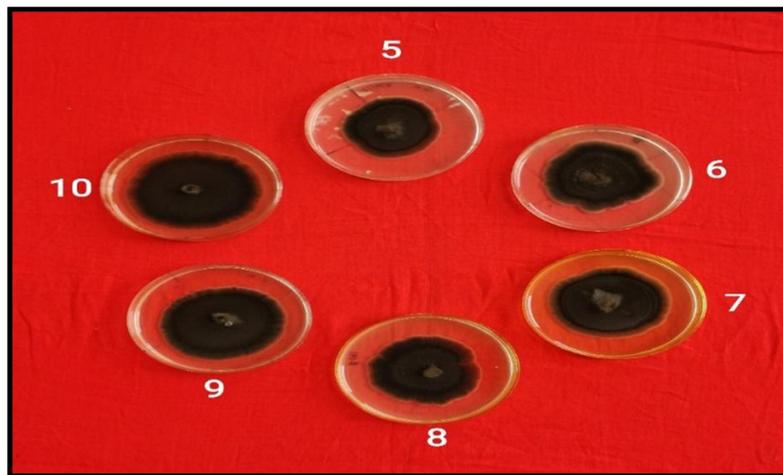
Different pH	<i>Curvularia spicifera</i>
5	60.31
6	70.31
7	79.06
8	83.12
9	85.62
10	88.12
SE(d)±	0.03
CD(0.05)	0.11

\*Mean of three replications

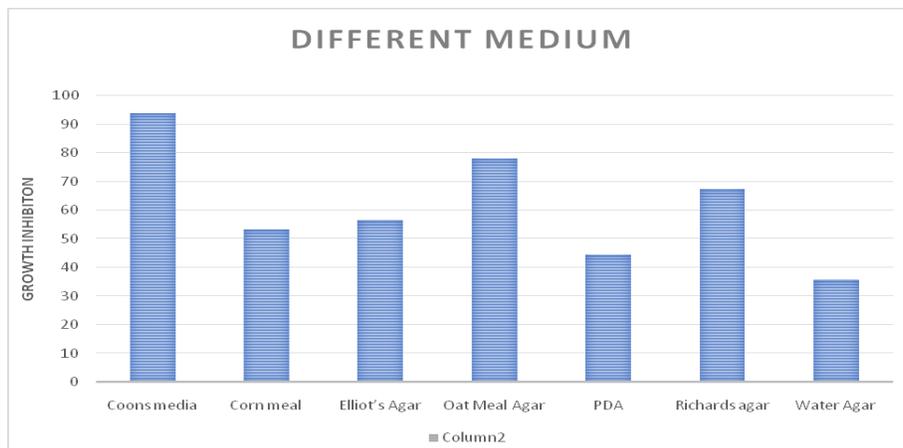
**Plate.1** Effect of different culture media on radial growth of *Curvularia spicifera*



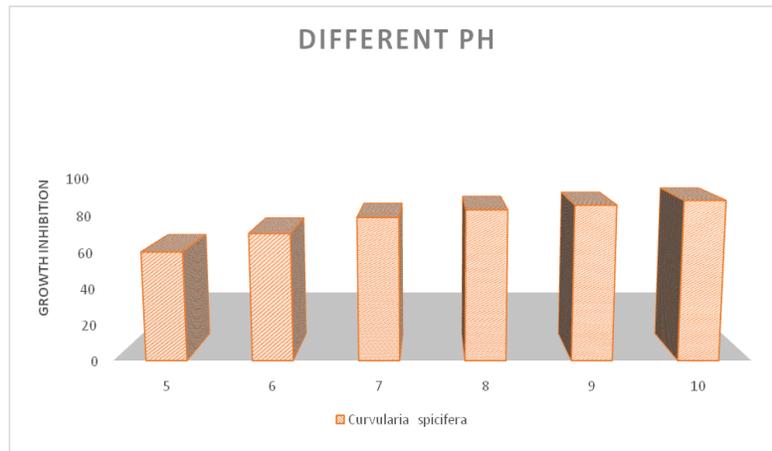
**Plate.2** Effect of different pH on growth of *Curvularia spicifera* on PDA



**Graph.1** Effect of different culture media on radial growth of *Curvularia spicifera*



**Graph.2** Effect of different pH on growth of *Curvularia spicifera* on PDA



In conclusion the results showed that different media and pH has clear cut effect on the mycelial growth of *Curvularia spicifera*. These findings showed that for management of *Curvularia spicifera* was also done by adjustment of pH.

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