

First report of foliicolous fungus *Trichothecium roseum* (Pers.) Link on sweet cherry *Prunus avium* L. from Kashmir Valley

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Abstract. Cherry *Prunus avium* L. is an important cash crop of Kashmir Valley. Cherry leaves are attacked by number of foliicolous fungi which in turn reduce yield of crop. Severe leaf spots were observed on cherry leaves in an orchard of district Baramulla of Kashmir Valley. These spots were similar to those caused by *Blumeriella jaapii* but smaller in size. Pathogenicity tests were conducted using detached leaf technique. Re isolation of spores from inoculated leaves confirmed *Trichothecium roseum* as causative agent of purple leaf spot of cherry. This is the first report of *Trichothecium roseum* responsible for leaf spot of cherry in Kashmir Valley.

Keywords: Cash crop; Cherry; Leaf spot; Yield; Foliicolous.

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Introduction

Cherry belongs to Family Rosaceae and Subfamily Prunoideae. It is cultivated in all the major temperate regions of the world. In India cherry is mainly cultivated in Jammu and Kashmir and to some extent in parts of Himachal Pradesh and Uttar Pradesh. Total area under cultivation of cherry in Jammu and Kashmir during 2012-2013 was 3.75 ha (Anonymous, 2012). Export of cherry from Jammu and Kashmir earns a handsome foreign exchange. Foliicolous fungi cause significant damage to the yield of cherry. Initially small

light purple spots 4 mm-5 mm, appear on upper surface of leaves that later on merge to form blotches (Figure 1a).

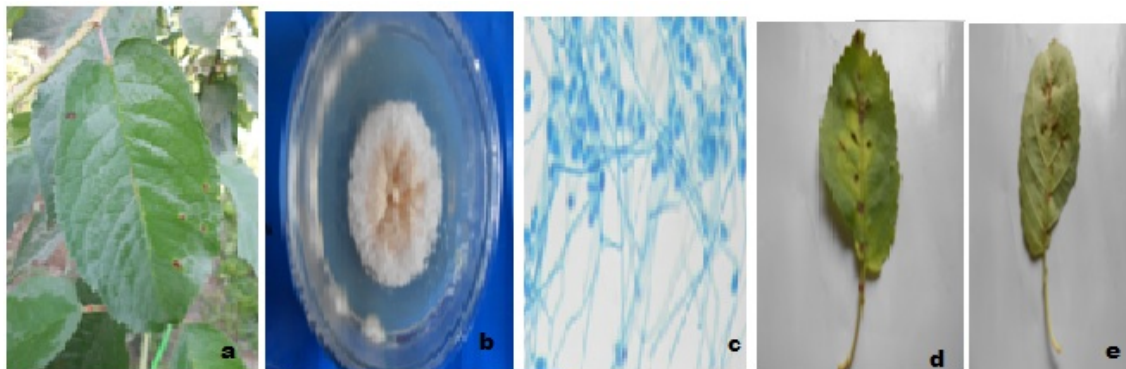


Figure 1. a. Infected leaves of Cherry; b. Culture of *Trichothecium roseum* on PDA. c. *Trichothecium roseum*: Mycelium with conidia (100x). d and e. Pathogenicity test on detached leaves (*in vitro*).

These blotches are of various shapes. Early infection begins from mid June. There is too much similarity in the symptoms of *Trichothecium* leaf spot and *Blumeriella* leaf spot with some minute differences. In the former small round purple spots appear on upper surface of leaves only while as in latter round purple spots appear on upper surface of leaves followed by red or white spots on lower surface of leaves.

Material and method

Survey and preliminary examination

A survey of an orchard of District Baramulla of Kashmir Valley was conducted in June-July 2019 to study the foliicolous fungus associated with severe cherry leaf spot. During the survey, infected leaf samples of cherry were collected in clean polythene bags and brought to laboratory. Preliminary examination of the collected specimen was done by sectioning method in which thin sections of leaf spots were cut with sterilized blade. These were then mounted on slide containing a drop of cotton blue in lactophenol and observed under compound microscope.

Isolation and Cultural examination

Fungi have diverse nutritional requirements (Cochrane, 1958). In order to obtain the maximum growth and sporulation of present fungus, four different culture media VIZ: Potato dextrose agar (PDA), Czapek Dox Agar (CDA), Modified Czapek Dox Agar and Host decoction + Agar media, were used. Infected leaf portions (about 5 mm x 5 mm) were cut, surface sterilized with 1% sodium hypochlorite for 2 min. These leaf bits were then washed in double distilled water, placed on Potato Dextrose Agar medium containing streptomycin sulphate (250 µg/mL of medium) and incubated at 24 °C ± 2 °C for 8 days. Same process was repeated for other three media. The pathogen produced maximum radial growth on Potato Dextrose Agar (PDA) medium followed by Czapeks Dox Agar (CDA), Modified Czapeks Dox Agar and Host decoction+Agar media. While as maximum sporulation was found on Host decoction + Agar medium followed by PDA, Modified CDA and CDA media (Figuras 2f, g and h).

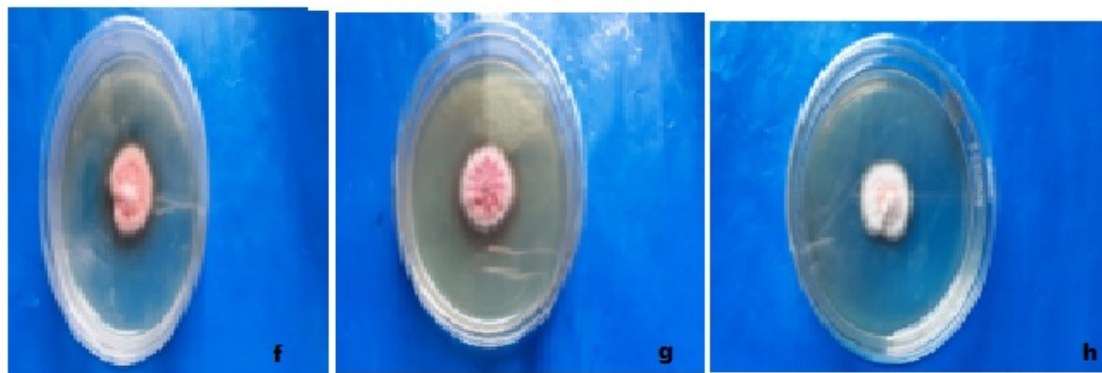


Figure 2. f, g and h. Culture of *T.roseum* on CDA, Modified CDA and Host decoction + agar media.

Table 1. Sporulation, morphology and mycelial growth of *Trichothecium roseum* on various media.

Media used	Sporulation	Colony morphology	Average Mycelial radial growth (mm)
PDA	+++	Circular, powdery, pinkish	31.33*
CDA	+	Circular, smooth, peachy	30.13
Modified CDA	++	Circular, smooth, peachy	29.46
Host decoction + Agar	++++	Circular, smooth, pinkish	27.23

++++ Very good; +++ Good; ++ Poor; + Very poor. *Mycelial growth in triplicates

Microscopic examination

Microscopic study revealed that mycelium is well developed, branched, hyaline and septate. Conidiophores are hyaline, straight, smooth, $144\ \mu\text{m} \times 3.0\ \mu\text{m}-4.5\ \mu\text{m}$, bearing conidia in zigzag manner. Conidia are bi-celled, pyriform, smooth, light pink colored, $4\ \mu\text{m}-10\ \mu\text{m} \times 12\ \mu\text{m}-19\ \mu\text{m}$. These were the characteristics similar to that of *T. roseum* (Figure 1c). The fungus was identified on the basis of cultural and microscopic characteristics through monographs and diagnostic keys. For further authenticity pure cultures were sent to ICAR New Delhi.

Pathogenicity test

Pathogenicity of fungus was conducted to confirm Koch's postulates by using 'detached leaf technique' (Satishkumar, 1994). In this method detached leaves with petiole inserted in 5% water agar were inoculated with spore suspension (5×10^4 conidia/mL) and then incubated at $24\ ^\circ\text{C} \pm 1\ ^\circ\text{C}$ (Aneja, 1996). Control leaves were not inoculated instead treated with distilled water. Symptoms similar to that observed in the field conditions were noticed after 7 days in inoculated leaves (Figure 1d and e). However, control leaves remained symptomless. Upon re-isolation of fungal spores from inoculated leaves similar fungal colonies were obtained. Pathogenicity tests were conducted twice under same conditions.

Discussion and conclusion

Trichothecium roseum fungus is mostly saprophytic or weakly parasitic and has been mainly found associated with rot. In India *Trichothecium roseum* has been reported as a rot fungus by many workers. There are only a few reports of *Trichothecium*

responsible for leaf spot from Kashmir Valley. *Trichothecium kashmeriana* sp. nov. has been reported on leaves of *Pyrus malus* L. and other *Trichothecium* sp. have been reported on leaves of *Berginia ciliata* Wall and *Rosa alba* L. from Kashmir Valley (Dar, 2017). Besides infecting cherry leaves, *Trichothecium roseum* has been found to infect leaves of other hosts such as mango, cherry laurel (Bernadovičová and Ivanová, 2011; Shilan et al., 2011). To our knowledge this is the first report of *Trichothecium roseum* causing leaf spot on cherry leaves from Kashmir Valley. This study will prove beneficial for the management of causative pathogen. However, further study is needed to work on other aspects of this pathogenic fungus *Trichothecium roseum*.

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Conflicts of interest

Authors declare that they do not own any conflicts of interest.

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