

Biodiversity of endophytic fungi on *Capsicum anum* L. from Amravati region, Maharashtra

SH Kanherkar

Research Centre in Botany, Yashwantrao Chavan Arts & Science Mahavidyalaya, Mangrulpir, Washim (MS), India

ABSTRACT

Endophytes constitutes an important components of microbial diversity. A total of 10 fungal isolates were isolated from various parts of *Capsicum anum* L. such as root, stem, leaf and fruit. Fungal endophytes were isolated from plant parts employing standard method of isolation. Endophytic fungi were isolated *Fulviafulva*, *Alternariasolani*, *A. alternata*, *A. porri*, *Alternaria* sp., *Colletotrichumacunatum*, *Cladosporiumsporoides*, *Alternaria* sp., *Botrytis cinera* and *Cercosporapersonata*. *Colletotrichumacunatum* were dominantly present and frequently isolated. Out of total fifty percent fungi were isolated from fruits of *Capsicum anum*.

Key Words: Biodiversity, Endophytes, Fungi, *Capsicum anum* L.

1. Introduction

Vegetable crops are very much important due to their higher yield potential and low cost of production and nutritional value being the added attributes. Vegetables are comparatively rich source of vitamins and minerals, which are essential for the maintenance of good health and resistance against diseases. Due to progressive development in the world, the level of nutrition and demand for a variety of food are increasing continuously. The main reason for low yield are poor quality seeds, low yielding cultivars, inadequate late plant protection measures and un-awareness of vegetables growers about modern production techniques [1].

In India, about 40 vegetable crops of varying significance are grown. For convenience, these vegetables can classify into three categories, namely: Underground Vegetables, Herbage Vegetables, and Fruit Vegetables [2].

Chili (*Capsicum anum* L.) belonging family Solanaceae is an annual sub-shrub constitutes is one of the most important spices cultivated all over the world except in colder parts. Chilies are cultivated mainly in tropical and sub-tropical countries like India, Japan, Mexico, Turkey, United States of America and African countries. In India, chilies grown in almost all states of the country and the major growing states in terms of production are Andhra Pradesh, Karnataka, Orissa, Maharashtra, West Bengal, Rajasthan, and Tamil Nadu. There are several varieties of chili cultivated in India [3]. In the present investigation survey of fungal diseases were carried out during the month of July 2014 to March 2015.

2. Materials and Methods

2.1 Field survey

The field survey has been carried out monthly to observe and collect the disease and disease symptoms photographs were

taken with the help of Nikon digital camera (6.0 megapixels). It gives direct images of object on screen [4].

2.2 Collocation of material and isolation of fungi -

A regular survey of infected plant parts of vegetable from different region viz. Amravati and Akola was made during the month of July 2014-March 2015. Various fungi causing diseases to vegetable chili were collected from different localities. The infected plant materials were collected in sterile polythene bags and brought in to the laboratory. These infected plant parts were undertaken for further studies.

2.2.1 Laboratory observation-

Infected plant parts were collected in sterile separate polyethylene bags as per infected morphological appearance from different area randomly with one-month interval. Laboratory section done by section cutting of infected healthy and diseased parts. 1% aqueous solution of lacto phenol cotton blue was used as stain and microscopic photographs also taken [4].

2.2.2 Indirect method-

Infected parts were cut into to 2 cm pieces and washed with tap water then transfer in 0.1% mercuric chloride (HgCl₂). Infected pieces transferred into flask containing 100 ml sterile distilled water and washed serially for 5-6 times with changing sterile distilled water in aseptic condition. These small pieces then aseptically transferred on sterile PDA medium.

2.3 Identification of isolates

The isolates were identified from available literature. Morphological and taxonomical studies of all the fungi were carried out in laboratory.

2.3 Pathogenicity test

Pathogenicity of the organism was confirmed by Koch's postulate method.

3. Results and Discussion

In the present investigation, various fungal pathogens were recorded on chili crop which produced various types of symptoms on the root, leaf, stem and fruit. The fungal survey was carried out in various seasons during July 2014- March 2015. In the month of August and September severity of infection was very high in all parts of chili crop. The chili crop was attacked by various diseases like fruit rot, leaf spot, grey mould rot, charcoal rot, and early blight, late blight, wilting of plant, and white rot.

The various types of fungal pathogens were found to be associated with various parts of chili plant. The isolates were identified with the help of micrometry, available literature

and stock culture available in the research laboratory of Yashwantarao Chavan Arts and Science Mahavidyalaya, Mangrulpir, Dist. Washim. Total 10 fungal species from chili were isolated from various parts. The fungi isolated from this vegetable show similar or different symptoms. Similarly, different fungal pathogens show dissimilar morphological characters in different localities and severity of infection also differs according to the climatic conditions. A list of fungal pathogens recorded during the course of present investigations is as follows.

3.1 Fungal pathogens isolated from chili-

1. *Colletotrichumcapsici*
2. *Fulviafulva*
3. *Alternariasolani*
4. *Alternariaalternata*
5. *Colletotrichumacutatum*
6. *Alternariaporri*
7. *Cladosporiumsporoides*
8. *Alternaria sp.*
9. *Botrytis cinera*
10. *Cercosporapersonata*.

The isolated fungal pathogens were further used for biocontrol aspect in which thirteen plant extracts were evaluated against 10 pathogens of chili.

4. References

1. Encyclopedia; 2013.
2. Pradhan S. Birla Publications, Delhi, 2003,
3. Madhuri V, Amrutha D, Gayathri. Root rot of chili incited by *Sclerotiumrolfsii*Sacc. And its management – A review. International Journal of Applied Biology and Pharmaceutical Technology. 2014, 198.
4. Kagate CA, Rane VI. Antagonistic activity on anthracnose a new disease causing by *Colletotrichumgraminicola* of sugarcane phylloplane in Gondia district (M.S.) India Int. J of Life Sciences, 2014; 2(4):325-328.
5. FAO. 2007. Online databases. In; <http://taostat.fao.org/collections>.