

Alternaria- a Dominant Fungal Pathogen of *Pisum spp.*

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Abstract: Crops of *Pisum sativum L.* and *Pisum arvense L.* were surveyed periodically to collect infected leaves from five locations at Raipur district viz. Indira Gandhi Krishi Vishvavidyalaya, Raipur, two villages Jora and Bhatagaon, farm house and kitchen garden of Kushalpur. Pea is one of the major rabi pulse crop of Chattisgarh. *Alternaria* was observed to be a dominant fungal pathogen in both the crops and was isolated using standard methods. *Alternaria citri* was isolated from diseased leaves of *Pisum sativum* and *Alternaria raphani* was isolated from leaves of *Pisum arvense*. *Alternaria citri* and *Alternaria raphani* were isolated from leaves, showing reddish brown, circular or oval spots. Isolates differed in their cultural characteristics on PDA media. Disease severity was very high. The conidial size recorded in *Alternaria raphani*, was $49\mu\text{m} \times 15\mu\text{m}$ and in *Alternaria citri* it was $39\mu\text{m} \times 15\mu\text{m}$.

Key words: Disease intensity, Isolation, pea.

I. Introduction

Pea is one of the most important cash crops for farmers of Chattisgarh. It is attacked by several diseases caused by fungi, bacteria and viruses. Wilt caused by *Fusarium oxysporum Schl.f.sp.pisi Synd. and Hans*. It occurs in an epiphytotic form almost every year. Heavy losses (60%) due to the disease have been reported to occur in the crop during the years of epiphytotics. Pea is cultivated chiefly in Punjab, Haryana, Uttar Pradesh, Himachal Pradesh and Chhattisgarh, used by millions of people as vegetable plant, forage and as green manure. It is an important vegetable used in diet and a good source of protein. Protein is an important nitrogenous macromolecule composed of amino acids linked together by peptide linkages (Stayanarayana and Chakrapati 2007). Proteins have been assayed from almost all parts of plants including leaves, nodules, stem fruit and seeds (Schiltz *et al* 2005; Burstin, 2008). Plant is constantly exposed and threatened by a variety of pathogenic micro-organisms present in their environments. Disease caused by plant pathogenic fungi significantly contribute to the overall loss in crop yield worldwide (Savary *et al* 2006; Montesinos, 2007). Pea is the second most important food legume in the world after pigeon pea. Wilt of pea caused by *Fusarium oxysporum Schl.f.sp. pisi Synd. and Hans*, is one of the most important disease of pea. The *Fusarium* wilt of pea was first recognized during 1918 by Bisby in Minnesota (Chupp and Sherf 1960). In India, first report of the occurrence of pea wilt pathogen was observed (Patel *et al* 1949) from Bombay.

II. Material and method

The fungal pathogens were isolated from infected leaves on Potato Dextrose Agar (PDA) medium (250.0 g potato, 20.0g dextrose, 20.0g agar, 1000ml distilled water, pH 4.5). Diseased leaves were collected and brought to the laboratory in polythene bags for the isolation and identification of the causal organisms. Infected portion of leaves were cut by means of sterilized razor in small pieces and dipped in 0.001% mercuric chloride solution for 30 seconds. The diseased pieces were then successively washed in sterilized petridishes containing PDA medium. The entire operations were carried out under aseptic conditions. The organisms thus obtained were repeatedly subcultured in order to get pure cultures. Pure cultures were maintained on PDA slants for further studies.

Cultural characteristics were observed after seven days of incubation period. Colony character, pigmentation, conidial size of *Alternaria citri* and *alternaria raphani* were measured by using micrometry. Ten observations were taken for conidial measurements and mean value was calculated.

III. Result

Field survey was carried out in Raipur district at five locations viz. Indira Gandhi Krishi Vishvavidyalaya, Raipur, two villages Jora and Bhatagaon, farm house and kitchen garden Kushalpur. Severe brown spots were observed on the plants of *Pisum sativum* and *Pisum arvense*. *Alternaria citri* and *Alternaria raphani* both were showing reddish brown oval or round spots on leaves develop under favorable environment condition (high humidity). Environmental factors play an important role in the development of disease. The

symptoms were initiated on 45 days old plants. The disease symptoms were observed as round, regular brown leaf spots on the entire surface of the leaves. The disease first appeared as minute reddish brown dots which later on turned in to circular spots up to 5mm diameter. The disease severity was very high (80%) (Table 1). Isolates differed in their cultural characteristics considerably on PDA. *Alternaria citri* produced circular colony, smooth, regular, blackish green in colour, no pigmentation whereas *Alternaria raphani* produced circular smooth, greyish white in colour, reddish pigmentation. Studies on morphological variation of the spores, however, have been limited although many observations have been made on spore morphology. Maximum conidial length was recorded for *Alternaria raphani* (45 µm) followed by *Alternaria citri* (39 µm). Conidial width of both species was found to be 15 µm. The crops was severely damage by the fungal pathogens resulting in great economic loss hence effective control measures should be adopted to eradicate the pathogen so as to harvest the healthy crop.





Table1- Disease Development on *Pisum spp.*

S. No.	Crop Host	Isolation Code	Pathogen	Degree of Infection	Disease Intensity	Symptoms
1	<i>Pisum sativum</i>	PS	<i>Alternaria citri</i>	Severe	80%	Dark Brown, Necrotic spots
2	<i>Pisum arvense</i>	PA	<i>Alternaria raphani</i>	Severe	80%	Dark Brown, Necrotic spots

Table2 - Cultural characteristics of *Alternaria spp.*

S. No.	Pathogen	Cultural Characteristics	Conidial length	Conidial width
1	<i>Alternaria citri</i>	Circular smooth blackish green in colour, no pigmentation	39 µm	15 µm
2	<i>Alternaria raphani</i>	Circular smooth, greyish white in colour, reddish pigmentation	45 µm	15 µm

Note : Average of ten replications

Diseased Leaf	Pathogen
	
<i>Pisum Sativum</i>	<i>Alternaria citri</i>
	
<i>Pisum arvense</i>	<i>Alternaria raphani</i>

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