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Survey & Isolation of follicolous necrotic fungi from *Vigna mungo* (L.) Hepper

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Abstract

Vigna mungo is a plant having good nutritional values and medicinal importance which plays a significant role in human nutrition. Many recent studies have been conducted on the nutritional quality of *V. mungo*. The studies suggest that *Vigna mungo* (L.) Hepper is a good source of protein, carbohydrate and minerals. Its medicinal uses are reported in different traditions of medicine such as Ayurveda and Unani. It is mostly used for therapeutic purposes and is known to possess antihypertensive and antidiabetic properties.

A periodical survey was conducted during the month of November-2012 to March-2013 to collect infected leaves of *V. mungo* (L.) Hepper from five different locations of Raipur district viz. Indira Gandhi Krishi Vishvavidyalaya, Raipur, two villages Jora and Bhatagaon, farm house and kitchen garden of Kushalpur Raipur. Severe brown spots were observed on the plants of *Vigna mungo* which were collected for phytopathological investigations. Total two fungal pathogens have been isolated from the leaves of the crop. *Fusarium semitectum (FS)* and *Corynespora cassiicola* (CC) were isolated from leaves showing reddish brown, circular, regular and necrotic spots. Leaves were severely damaged in both symptoms and both species of *Fusarium semitectum (FS)* and *Corynespora cassiicola* showed severe degree of infection and disease intensities. Pathogenicity test was proved by Koch's postulate. Conidial size was measured using micrometry.

Suitable control and protective measures should be taken into account to prevent this major kharif crop from the microbial invasion so as to get a healthy crop of immense nutritive value.

India is one of the major pulses contributors in global pulse economy. In pulses uridbean (*Vigna mungo*) is very important kharif crop of the country. The food value of uridbean lies in its high and easily digestible protein which is approximately 25-28 per cent in India. Area of production and productivity of urid bean has increased since 1971-75 and

presently, India is known to be one of the largest urid bean producers in the world having cultivated area of 3.30 mha and production of 1.83 mt.[6]. Beans are excellent source of protein, vitamins and minerals particularly calcium, phosphorus and iron and thus are highly nutritious[12]. It has been used for various medicinal purposes in Ayurvedic and Unani system of medicine useful in piles, asthama, paralysis, leucoderma, gonorrhea and infection of the nervous system, liver and cough. Plant derived medicines are widely used because they are relatively safer than the synthetic alternatives, they are easily available and cheaper[9,13]. The present paper deals with the survey, screening and isolation of the fungal pathogens from this crop along with the nutritional and medicinal significance of the plant.

Two fungal pathogens viz. *Fusarium semitectum (FS)* and *Corynespora cassiicola (CC)* 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 isolates thus obtained were repeatedly subcultured in order to get pure cultures. Pure cultures were maintained on PDA slants for further studies. Pathogenicity was proved by attached leaf method under natural conditions to ensure Koch's Postulate. The pathogenicity was confirmed by attached leaf method under greenhouse conditions the leaves were pin pricked using sterilized needle and cultures were inoculated on the respective leaves in triplicate under aseptic conditions.

Cultural characteristics were observed after seven days of incubation period. Colony characters, pigmentation, conidial size of *Fusarium semitectum (FS), Corynespora cassiicola* (CC) were measured by using micrometry. Ten observations were taken for conidial measurements and mean value was calculated.

During field survey from November 2012 to March 2013 from five different locations the foliar infections were collected and their symptoms were analysed. *Fusarium semitectum (FS)* and *Corynospora cassiicola (CC)* were isolated from leaves showing reddish brown, circular, regular, necrotic spots. Leaves were severely damaged in both symptoms. The symptoms were initiated on 45 days old plants. The disease progression was very fast. The disease severity was very high (Table-1). Environmental factors play an important role in the development of disease. *Fusarium semitectum* produced circular colony off white in colour with cottony growth. *Corynespora cassiicola* produced round thick colony, creamy white in colour. Conidial size recorded in *Corynespora cassiicola* was 40×15µm and in *Fusarium semitectum it was* 33×15µm. Pathogenicity test (Koch's postulate) was proved by direct inoculating healthy leaves of the respective host plant with conidial suspension and within 8 to 15 days similar symptoms were observed as on naturally infected leaves. The leaves spread with

distilled water only did not show any symptoms. The re-isolated causal organisms were identical with that from the natural affected leaves. *Fusarium* is one of the most important genus of plant pathogenic fungi[8]. *Fusarium semitectum* was found to be responsible for causing disease like wilts, blights, root rot canker in coffee, pine trees, wheat, corn, rice cereals, carnations and grasses[5]. *Corynespora cassiicola* reported to infect numerous economically imported crops both in tropical and sub tropical countries[3] in Shri Lanka, the fungus has spread to all rubber plantation, becoming the most destructive foliar disease to affect the growth of this crops[15]. Fungi are the most important group of pathogens and a very wide range of species are parasites of the legume crops, which reduce the crop yields. Species of A*lternaria, Fusarium, Trichothecium and Cladosporium* were associated with poor emergence of soybean in north western hill of Uttar Pradesh[14]. The incidence and distribution of *Phytophthora* blight of pigeonpea in different agro climatic zones of Uttar Pradesh[11]. The present study is an attempt to analyse the nutritional and medicinal properties of the plant. In additional phytopathological investigations are being made to get the disease free crop so that immense nutritional and medicinal properties of the plant can be completely explored.

Table-1. Disease Development on *Vigna mungo*

S. No.	Crop host	Isolation code	Pathogen	Degree of infection	Disease intensity	Symptoms
1	*Vigna mungo*	VM	*Fusarium semitectum*	Severe	80%	Dark brown, Necrotic spots
2	*Vigna mungo*	VM	*Corynespora cassiicola*	Severe	80%	Dark brown, Necrotic spots

Table-2. Cultural characteristics of *Fusarium semitectum and Corynespora cassiicola*

S. No.	Pathogen	Cultural characteristics	Average conidial length	Average conidial width	Average conidial size
1	*Vigna mungo*	Circular colony off white in colour, cottony growth	33 µm	15 µm	33x15 µm
2	*Vigna mungo*	Circular thick colony, creamy white in colour	40 µm	15 µm	40x15 µm

Note: Average of ten replications

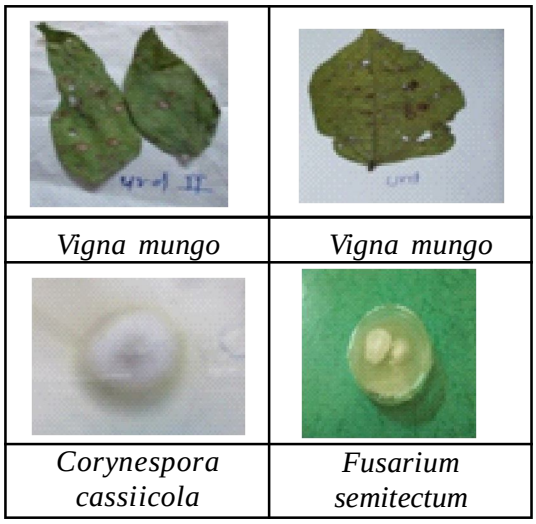
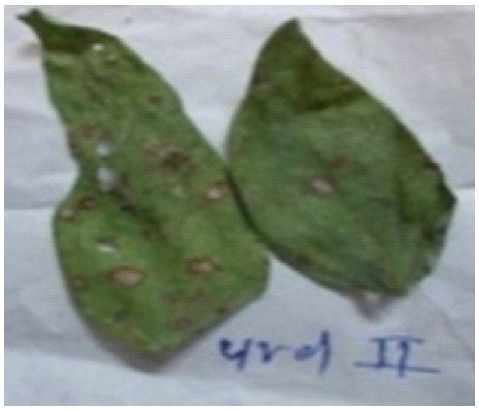
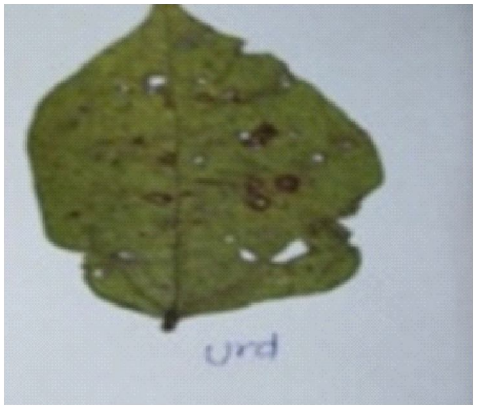
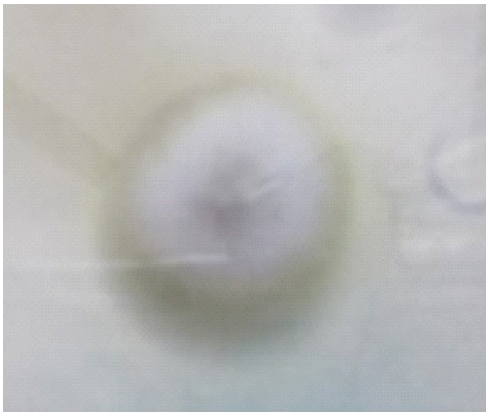
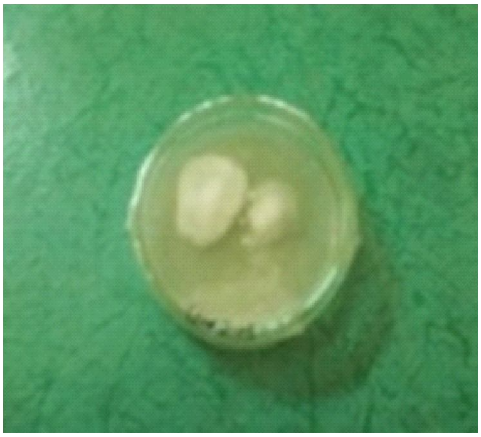


Fig. 1. Disease symptoms and isolation of the fungal pathogens from *Vigna mungo*









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