RESEARCH ARTICLE

Study of Identification of Fungi from Infected Black gram Plant from Barshitakali Taluka, Dist. Akola (MS) India

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ABSTRACT

Identification of fungi from infected black gram plant was carried out in present investigation. Various fungal pathogens were identified from black gram plants with respect to different localities and different varieties at field condition. Black gram samples were collected from regions of Barshitakli, taluka. Total nine and twelve fungi were identified from two variety of black gram TAU-1 and TAU-2 respectively. Black gram (*Vigna mungo* (L.) Hepper) is one of the most widely used pulse crop of India. Black gram was found in ancient Indian literature like Kautilya *Arthasastra* and Charkas *Charka samhita.* It is widely cultivated in many tropical and subtropical regions of the world including India, Iran, Malaysia, East Africa and many southern European countries.

Key words: Black gram, TAU-1 and 2, Fungi and pathogens.

INTRODUCTION

In recent years it has been observed that, on one hand the area under crop cultivation is decreasing and the demand for food grains is increasing due to increase in population. To meet the increasing demand we have to increase the food grain productivity. Apart from availability of all the necessary facilities and resources for production, the main hurdle is the disease incidence on crop plants. Therefore, it is essential to identify different diseases and their causative agents to combat this problem.

The ability of fungi to invade plant and animal tissues was observed in early 19thcentury. Bassi (1835) reported the animal infection by fungus. He studied the muscardine disease of silkworm and proved that the infection was caused by a fungus *Beauveria bassiana*. Fungi inhabit almost every niche in the environment and humans are also exposed to these organisms in life. Like humans and animals, plants also suffer from various diseases. Diseased plants furnishes lower yield with low quality

production creating concern for those peoples whose income is very less. On an average 14% of the total loss in crop yield is due to plant diseases (Agrios, 2005) and more than 50% plant diseases are caused by fungi leading to huge economic loss.

Plant diseases continue to cause serious problems in global food production. Currently more than 800 million people do not have adequate food and at least 10% of global food production is lost due to plant disease (Strange, 2005). Not only does plant disease affect human food production but it also impacts natural systems (Burdon *et al*., 2006). Introduced diseases such as Chestnut blight in the Eastern US, and more recently the increasing occurrence of sudden Oak death, have resulted in the rapid decline of dominant tree species and triggered major impacts on forest systems (Condeso and Mentemeyer, 2007).

Black gram is botanically named as *Vigna mungo (L.) Hepper,* is one of the most widely used pulse crop in India. Black gram was found in ancient Indian literatures like Kautilya*'Arthasastra'* and Charka's *'charka samhita'.* It is widely cultivated in many tropical and subtropical regions of the world including India, Iran, Malaysia, East Africa and many southern European countries. The pulse is used in rheumatism, nervous and hepatic diseases. It is also useful in dropsy and cephalagia as a diuretic. Besides, it is cooling and astringent and used as diet in fevers and for strengthening the eyes. The roots of the plant are narcotic and are used for aching bones. The plant prevents soil erosion and conserves soil moisture.

Black gram (*Vigna mungo* (L.) Hepper is one of the major pulse crops of the tropics and sub tropics. It is the third major pulse crop cultivated in the Indian subcontinent. Pulses and grain legumes are major sources of dietary protein. These crops are subjected to yellow mosaic and golden mosaic diseases caused by white fly transmitted Gemini viruses. Of these viruses, mungbean yellow mosaic virus is an important one, and it infects five major leguminous species, such as blackgram, greengram, Frenchbean, Pigeonpea and Soybean causing an annual yield loss of about US $ 300 million **(**Varma *et al,.*1992). The MYMV causes 85-100 per cent yield loss in the plants that are infected at the seedling stage **(**Nene, 1973).MYMV was first observed in Delhi in the late fifties (Nariani, 1960).

MATERIAL AND METHODS

a) Isolation of fungi from infected plant parts of black gram

Infected plant parts of two Black gram varieties viz. TAU-1 and TAU-2 were collected from Barshitakli. The infected plant material was collected from the agricultural field. Small pieces measuring 2 mm^2, each of infected tissue were cut off from infected black gram plants with the help of sterile sharp knife. Pieces of diseased fruit were washed with tap water and surface sterilized with 1% Sodium hypochloride solution for 2 min .and washed twice with sterilized distilled water and then dried using sterile filter paper. The infected plant parts were separately transferred to sterilized petri-dishes containing Potato dextrose agar (PDA) medium and incubated at 25^0C for 10 days. Petri-dishes were observed daily and colonies of fungi were chosen. The isolated fungi were purified using single spore technique and then kept in a refrigerator on PDA medium (Gams *et al*., 1998). Pure colonies of fungal isolates were identified according to Ellis (1971) .Symptoms were confirmed by Koch's postulates.

b) Study of symptoms of fungal diseases on black gram

Study of Symptoms were carried out on the following different varieties of black gram

i) TAU-1
ii) TAU-2

c) Method of petriplate exposure

The Petridishes (9cm- diameters) containing 20ml selected Potato Dextrose Agar (PDA) medium were exposed at 1 meter height from ground level in every cases for 15 min. over black gram field every week. The exposed petriplates were brought to the laboratory and incubated in an inverted position at 28 º C ±1 ºC for 7 to 8 days. The colonies developed were examined regularly, counted and identified. The fungal colonies were enumerated after their growth on the petri plates.

d) Identification of fungi

Identification of fungal colonies were made by visual and microscopic examinations. Identification up to generic level was done with the help of standard mycological books and manuals. Details regarding the qualitative nature of the mycoflora, their incidence, abundance and percentage contribution were recorded. The percentage contribution of each genus

was calculated on the basis of number of colonies of the genus against total number of colonies of all recorded genera during the two Kharif seasons (2011 and 2012) over black.

RESULTS

In order to study the fungi associated with the black gram, the samples of infected black gram parts were collected from different agricultural field of Barshitakli Talukas of Akola district. These infected samples were brought to the laboratory. Infected tissues of the plant were cut and sterilized with 0.1% Mercuric chloride, washed thrice with sterile distilled water and placed on PDA medium. After incubation period of seven days grown fungi were isolated and identified and results are noted.

Table 3: Isolation of fungi from different varieties of Black gram

Fungi	Black gram varieties	
	TAU-1	TAU-2
Rhozopus stolonifer	-	+
Chaetomium sp.	-	+
Erysiphe polygoni	+	+
Alternaria solani	+	+
Aspergillus niger	+	-
Aspergillus flavus	-	+
Cercospora canescence	+	+
Cladosporium sp	+	+
Colletotrichum lindemuthianum	+	-
Curvularia lunata	+	+
Fusarium oxysporum	-	+
Fusarium solani	+	-
Helminthosporium sp.	+	+
Phytopthora parasitica	-	+

'+' = Presence of fungus
'-' = Absence of fungus

TAU-1 variety of black gram gave nine fungi viz. *Erysiphe polygoni, Alternaria solani, Aspergillus niger, Cercospora canescence, Cladosporium sp., Colletotrichum lindemuthianum,Curvularia lunata, Fusarium solani and Helminthosporium sp.* and variety of TAU-2 gave *Rhizopus stolinifer, Chaetomium sp*., *Erysiphe polygoni, Alternaria solani, Aspergillus flavus, Cercospora canescence, Cladosporium sp., Curvularia lunata, Fusarium solani, Helminthosporium sp.,Phytopthora parasitica. Erysiphe polygoni, Cercospora canescence, Curvularia lunata* and *Fusarium sp.* The diseases caused by fungal pathogens were found on both varieties of black gram. (Table 1).

Fig. 1: Disease infected plants of black gram in the field

DISCUSSION AND CONCLUSION

The variation in mycoflora observed may be due to different environmental conditions at different localities. Some fungi which were not isolated from black gram of this region may be non- occurrence in the area. The present report on the fungi suggests favourable conditions of the region for the mycoflora isolated. The Variations in the composition of mycoflora in different varieties of black gram reflects the variable degree of resistance and susceptibility for the establishment of particular group of fungi in the varieties yielding maximum number of fungal species. On the contrary, the varieties with poor incidence of fungi represent their resistant capacity.

The fungal pathogen such as *Cercospora canescens* caused the *Cercospora* leaf spot disease to black gram crops. *Cercospora* leaf spot is a devastating disease that causes qualitative and quantitative losses to the crop (Sivaprakasam, 1983). These disease cause serious losses maximum loss of 61% was observed in case of grain yield (Iqbal *et al.,* 1995). The *Cercospora* leaf spot

disease well-defined spots often bound by veins and purplish border develop, the centers of which may turn grey, it appearing about 5 to 6 weeks after planting, depending upon the weather condition mostly temperature and humidity. It also caused premature defoliation and reduction in size of pods and grains. Similar observations are reported by Grewal *et al.,* (1980).

It can be concluded that. The farmers should be scientifically acquainted and trained by scientists or experts about use of disease resistant varieties. To know about disease cycle, Identification of symptoms of disease at an early stage, Field sanitary practices, Crop rotation systems, methods of intercropping, proper use of water to a specific interval etc. Are the aspects whose knowledge would be useful to farmers to avoid problems of yield loss of agricultural crops.

Conflicts of interest: The authors stated that no conflicts of interest.

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