

Effect of dominant seed mycoflora on seed germination and seedling rot diseases of fenugreek (*Trigonella foenum-graecum* Linn.) in Rohilkhand.

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ABSTRACT

Six dominant fungi of seed mycoflora namely, *Alternaria alternata*, *Aspergillus flavus*, *A. niger*, *Curvularia lunata*, *Fusarium moniliforme* and *Penicillium* sp. isolated from fenugreek seeds were selected to study their role of seed germination and cause seedlings rot disease (pre and post emergence rot) and seedling blight in Rohilkhand. *A. niger*, *A. alternata*, *C. lunata* and *F. moniliforme* were highly damaging as they caused more than 70% rot of seeds and seedling rot and *A. niger* caused maximum pre-emergence rot (56%) while *A. alternata* caused maximum post emergence rot (36%) of fenugreek. Seed mycoflora of fenugreek acts as basic source for pathogenic diseases of this crop, thus affect the cultivation of crop and cause considerable damage of the leafy vegetable and seeds. The seeds of fenugreek are widely used as spices, condiments and medicines. It is one of the most geographically widespread spices having excellent medicinal properties. It is a gift of nature to the mankind as its regular use keeps the body healthy.

KEY WORDS: Fenugreek, seed mycoflora, seed germination and seedling rot.

I. INTRODUCTION

Seed mycoflora of fenugreek (*Trigonella foenum-graecum* Linn.) play an important role for the development of pathogenic diseases of this crop, thus affect the cultivation of crop and cause considerable damage of the leafy vegetable and seeds. The fungal pathogens of this crop are externally or internally seed-borne Giridhar and Reddy [6] and EI-Nagerabi [5] and are associated with the seed as contaminants. The seeds of fenugreek are widely used as spices, condiments and medicines. Seed mycoflora of fenugreek were selected to study their role in inhibition of seed germination and production of seedlings rot (pre and post emergence) and seedling blight. Therefore the present study is planned to bridge the gap on dearth of literature on this aspect of fenugreek crop production through documenting the seed mycoflora and severity of some occurring pathogenic diseases in different agro-climatic areas of Rohilkhand region is signifies the need and scope of present pathological studies.

II. MATERIAL AND METHODS

Seed-mycoflora of fenugreek was studied by standard methods viz. Moist blotter method and Agar-plate method I.S.T.A [8]. The seeds were surface sterilized by 45-60 second dip in 0.1% mercuric chloride solution followed by washing four times in sterilized distilled water. Three layers of sterilized blotter papers soaked in sterilized distilled water were kept in Petri dishes on which the surface sterilized seeds were spread uniformly. In Agar plate method, sterilized Petri plates containing P.D.A. medium were employed. The plates were incubated at $26 \pm 1^{\circ}\text{C}$ for 7 days under 12 hours alternate cycles of light and darkness. Seed mycoflora of fenugreek was identified on the basis of growth, mycelium, conidiophore, chain formation and conidial morphology which were studied with the help of trinocular research microscope (Olympus BHTU-312).

Seed mycoflora namely, *Alternaria alternata*, *Aspergillus flavus*, *A. niger*, *Curvularia lunata*, *Fusarium moniliforme* and *Penicillium* sp. isolated from fenugreek seeds were selected to study their role in inhibition of seed germination and production of pre and post emergence rot of seedlings and seedling blight in Phytopathology Lab, Department of Botany, Bareilly College, Bareilly. For this purpose surface sterilized seeds were dipped in the spore suspension of the fungal isolates for the 24 hours. The treated and dried seeds were stored in sterilized polythene bags in the laboratory conditions. Inoculated seeds were, then sown on moist and sterilized filter papers kept in sterilized Petri dishes together with proper control sets. Percentage seed germination, pre and post-emergence seedling rots were recorded after 15 days.

III. RESULT AND DISCUSSION

Six dominant fungal pathogens of seed mycoflora (*Alternaria alternata*, *Aspergillus flavus*, *A. niger*, *Curvularia lunata*, *Fusarium moniliforme* and *Penicillium* sp.) of fenugreek were selected to study their role in seed germination and seedling diseases. The results are given in table & fig. It is evident from the table that all dominant seed mycoflora of fenugreek retarded percent seed germination and caused seedling rots. The maximum reduction (56%) of seed germination (pre-emergence rot) of fenugreek caused by *Aspergillus niger* followed by *Fusarium moniliforme* (48%) and *Alternaria alternata* (42%). A minimum of 38% pre-emergence rot was noted by *A. flavus*. During seed germination and juvenile stages are more vulnerable to infection by *Penicillium* sp. in plants resulting caused pre-emergence damping off [10]. A maximum post-emergence rot caused by *A. alternata* (36%) followed by *A. niger* (35%) and *Curvularia lunata* (33%). *Penicillium* sp. caused minimum post-emergence rot (27%). *A. niger*, *A. alternata*, *C. lunata* and *F. moniliforme* were highly pathogenic on the seeds of fenugreek as they caused more than 70% rot of seeds and seedling. Several isolated pathogenic fungi have been reported from seeds of different crops causing diseases such as seed rot, foot rot, wilt and foliar diseases [1]. Some of the seed borne fungi are also known to cause seed rot, decrease seed germination, seedling death and cause pre and post damping off due to some factors such as moisture content of the seed, temperature and the degree of invasion of seed by pathogenic fungi [2]. The identical effect of seed borne fungi on seeds of health of Green Gram studied by Sadhu [13], Kumar and Karan [9], Rashid [12] and Sarkar and Saxena [14] also confirmed the rotting effect by many fungi isolated from seeds of various hosts. *Fusarium* sp. and *Pythium* sp. usually fail to germinate of seeds due to attack resulting in poor stand development Goldberg [7]. *Fusarium moniliforme*, *F.sp.*, and *Aspergillus flavus* were responsible for seedling blight of Green gram studied by Chilkuri and Giri [4]. Fungal metabolites not only affect seed health, cause damage in seedling, enhance disease incidence in later stage of plant but also affect consumers by Bateman and Kwasna [3]. Many pathogenic fungi present in the soil that can cause seedling death. The fungus attacks the plant soon after germination and apparently exerts its effect in substantial part by production of oxalic acid. *A. flavus* Rasheed *et al.*, [11] cause post emergence infection. Therefore, the study that indicates need to control the seed mycoflora of fenugreek and soil borne fungi for the cultivation of leafy vegetable and seeds.

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Table & fig.: Role of dominant seed mycoflora on seed germination and seedling rot of fenugreek (*Trigonella foneum-graecum* Linn).

Name of fungi	Normal germination (%)	Pre-emergence rot (%)	Post-emergence rot (%)
<i>Alternaria alternata</i>	22	42	36
<i>Aspergillus flavus</i>	32	38	30
<i>A. niger</i>	19	56	35
<i>Curvularia lunata</i>	23	44	33
<i>Fusarium moniliforme</i>	23	48	29
<i>Penicillium</i> sp.	32	41	27
S.Em [†]	0.61	0.81	0.41
C.D. (5%)	3.14	1.04	1.11
F. value	*	*	*

REFERENCES

- [1]. Al- Kassim, M.Y and M.N.Monawar (2000). Seed-borne Fungi of Some Vegetable Seeds in Gazan Province and Their Chemical Control. Saudi J. of Biol. Sci. Vol 7 (2):179-185
- [2]. Anjorin, S.T. and M. Mohammed (2009). Effects of Seedborne Fungi on Germination and Seedling Growth of Watermelon (*Citrullus lanatus*). J. Agric. Soc. Sci., 5: 77-80
- [3]. Bateman, G.L. and, H. Kwasna, 1999. Effect of Number of Winter Wheat Crops Grown Successively on Fungal Communities on Wheat Roots. 13 : 271-382.
- [4]. Chilkuri Ashwini and Giri GK, 2014. Detection and transmission of seed-borne mycoflora in Green gram and effect of different fungicides. *International journal of advanced research*, 5(5): 1182-1186.
- [5]. EI-Nagerabi, S.A.F. (2002). Determination of seed-borne fungi and detection of aflatoxins in Sudanese fenugreek seeds. *Phytoparasitica* 30(1): 61-66.
- [6]. Giridhar, P. and Reddy, S.M. (1999). Effect of some food preservatives on seed mycoflora of fenugreek. *Seed Research* 25(1): 92-93.
- [7]. Goldberg N. P. (2011) Chile Pepper Diseases Circular 549 Consumer and Environmental Sciences New Mexico State University
- [8]. I.S.T.A. (International Seed Testing Association), (1996). International rules for Seed Testing. *Seed Sci. Technol.* 4: 3-49.

- [9]. **Kumar, V. and Karan, D. (1981).** Seed mycoflora of cowpea (*Vigna sinensis*) and its control of germination. *Int. J. Bot.* **4(2)**: 187-190.
- [10]. **Parker, K.C. (1999).** Pythium aphanidermatum Soilborne pathogen PP728 class project. North Carolina State University.
- [11]. **Rasheed, S., Dawar, S. and Ghaffar, A. (2004)** Location of fungi in groundnut seed. *Pak. J. Bot.*, 36(3): 663-668.
- [12]. **Rashid, A.Q., Barma, A.C. and Saikh, M.A. (1983).** Seed-borne fungi of mungbean and their pathogenicity. *Bangladesh J. Bot.* **12(2)**: 223-224.
- [13]. **Sadhu, K. A. (2014).** Seed-Borne Fungi and their Effect on Seed Health of Green Gram. *Biosci. Disc.*, **5(2)**:251-255.
- [14]. **Sarkar, S.K. and Saxena, S.C. (2007).** Pathogenic Potential and Management of seed mycoflora of sunhemp (*Crotalaria juncea* L.). *J. Mycol. and Pl. Path.* **37(3)**: 439-441.