INTERNATIONAL JOURNAL OF RESEARCHES IN BIOSCIENCES, AGRICULTURE & TECHNOLOGY
© VISHWASHANTI MULTIPURPOSE SOCIETY (Global Peace Multipurpose Society) R. No. MH-659/13(N)
www.vmsindia.org

Association of Seed-Borne Fungi on Chilli Seeds

Damayanti D. Guldekar, Subhash Potdukhe , A.P. Kakde, K .T. Thakre and Maya Raut
Plant Pathology Section, College of Agriculture, Nagpur – 440 001 (MS) India
Email : guldekard@gmail.com

Abstract
An investigation entitled "Association of different seed-borne fungi with different chilli seeds" was carried out during 2014 – 2015. Seed samples were collected from different location of Nagpur district. Five different types of seed borne fungi viz., Aspergillus, Fusarium, Alternaria, Curvularia and Colletotrichum were found associated with seeds following blotter paper method were detected. Study revealed that total association of fungi was highest in variety Deepika followed by Var-334 whereas comparatively less in Shimla and lowest fungi association was recorded in the varieties of Teja-4 and C-5. Blotter paper method recorded maximum per cent association of fungi as compared to 2,4-D blotter method.

Key words: Chilli, Trichoderma viride, seed borne mycoflora

Introduction

Chilli (*Capsicum annuum* L), is an important commercial vegetable crop in India belongs to Solanaceae family. It is also called as natures wonder, hot pepper, cayenne pepper. It is an excellent source of vitamin A, C and E. The pungency in chilli is due to an alkaloid capsicin, which has high medicinal value. The area under chilli cultivation is 794.12 ha and 99.50 ha with producing about 1304.38 MT and 45.60 MT and average productivity 1.6 MT ha^{-1} and 2.1 MT ha^{-1} in India and Maharashtra, respectively (Anonymous, 2013). Seed-borne diseases are able to spread across international borders very easily and are often difficult to control because they are difficult to identify, with typical symptoms being rare on seed surfaces except in some legumes. Seeds are the passive carriers of some important seed borne diseases caused by microorganisms which usually result in considerable yield losses. Early identification and listing of plant pathogens in an area allows for timely development of control and management strategies that goes a long way in avoiding epidemics and crop losses. It is also a means of checking the spread of many seed borne diseases and ensures the prevention of the spread of plant diseases to new areas. The fungicides and biological agents were capable of inducing significant effect in germination and seedling vigour index along with disease control (Jogi *et al.*, 2010). The important diseases reported are Anthracnose (*Colletotrichum capsici*), Cercospora leaf spot (*Cercospora capsici*), damping-off and root rot (*Rhizoctonia solani*, *Pythium* sp., and *Fusarium* sp.), Fusarium wilt (*Fusarium oxysporum* f.sp. *capsici*), gray mould (*Botrytis cinerea*), powdery mildew (*Leveillula taurica*) etc (Vidhyasekaran and Thiagarajan 1981; Meon and Nick,1988; Pandey *et al.,* 2012). Seed borne pathogens are seed transmissible and cause diseases at various stages of crop growth from seed germination to crop maturity and may cause heavy losses. The present investigation is to detect the seed borne mycoflora of chilli seeds from the study area.

Materials and Methods

The investigation was carried out during year 2014-15 in Nagpur district, Maharashtra, India for the study of seed-borne mycoflora of chilli seeds. Seed sample of ten different varieties of chilli viz., Chandramukhi, Deepika, Jayanti, Teja-4, Var-334, Var-314, C-5, Loc. Var-1, Wonder hot and Shimla were collected from different location of Nagpur district. Potato Dextrose Agar (PDA) medium was used for isolation of seed borne mycoflora of chilli seeds.

Detection of seed borne mycoflora of chilli seed was carried out by blotter paper method and 2,4-D blotter paper method (Anon, 1996). The unsterilized 400 seeds were plated at equidistance by sterile forcep in surfaced disinfected transparent plastic plates of 90 mm diameter. For blotter paper method 25 seeds were plated in each plastic plate (15 in outer layer, 9 in middle and 1 in center). However, while plating the seed on blotter surface, care was taken that the blotter is sufficiently moist. In case of 2,4-D blotter paper method, the blotter paper method in 0.1 % 2,4-D suspension and placed in petriplate. Seed plated plates were incubated at room temperature (27 ± 1^0C) in laboratory under 12 hours alternating cycle near ordinary tube light and darkness for 7 days to develop the fungal flora. Observation of fungal colonies on and around the seeds were made by using stereoscopic binocular research microscope and their growth was lifted by sterile inoculating needle and transferred to PDA plates for purification and pure isolates were received by periodic transfer and maintained for further investigation. The morphology and characters of fungi were studied and identified by referring the

manual on "Identification of Plant Pathogenic and Biocontrol Fungi of Agricultural importance" (Choudhary, 2000). Recorded percent association of seed borne fungi on different varieties of chilli seed sample.

RESULTS AND DISCUSSION

The results in respect of blotter paper method on per cent association of seed-borne fungi on different varieties of chilli seeds are tabulated in Table 1. It was clearly observed from data that there were eight different fungi (Plate 1) identified from seeds of chilli which four belongs to *Aspergillus*, and one each from *Fusarium Alternaria*, *Curvularia* and *Colletotrichum*.

Association of eight fungi belonging to five genera viz., *Aspergillus niger* in the range of (11.75 to 53.5 %), *Aspergillus flavus* (11 to 51.25 %), *Aspergillus sp.* (0 to 10.5), *Aspergillus nidulans (0 to 19.25), Fusarium oxysporum* (0 to 20.5 %), *Alternaria alternata* (0 to 16.5%).*Curvularia lunata* (0 to 9.25%) and *Colletotrichum capsici* (9.25 to 28.25) was recorded during the study.

The results are tabulated in Table 1 in respect of 2,4-D blotter paper method on per cent association of seed-borne fungi on different varieties of chilli seed. It was clearly observed from data there were association of eight fungi belonging to five genera viz., *Aspergillus niger* in the range of (5.25 to 48.75 %), *Aspergillus flavus* (9.00 to 57.25 %), *Aspergillus* sp. (0 to 12.75), *Aspergillus nidulans* (0.75 to 19.25), *Fusarium oxysporum* (0 to 21.00 %), *Alternaria alternata* (0 to 17.50%).*Curvularia lunata* (0 to 10.0%) and *Colletotrichum capsici* (3.50 to 28.25).

Total association of fungi was highest in variety Deepika followed by Var-334 whereas comparatively less in Shimla. Whereas, lowest fungi association was recorded in the varieties of Teja-4 and C-5. Blotter paper method recorded (Fig.1) maximum per cent association of fungi as compared to 2,4-D blotter method (Fig.2).The result of present investigation are similar observed and reported by Chigoziri and Ekefan (2013) and others for the association of *Colletotrichum capsici* (54.75%), *Aspergillus niger* (44.00%) and *Aspergillus flavus* (29.75%). Kalyani Kumari *et al.* (2012) showed the presence of fungal pathogen viz., *Aspergillus niger, A. flavus, Alternaria alternata* on chilli seed. Jogi *et al.* (2010) confirmed the association of seed borne fungi viz., *Aspergillus species, Fusarium oxysporum and Colletotricum capsici.* Telang *et al.* (2010) recorded *A. niger*, *A. flavus* and *Curvularia lunata* association on chilli seed. In chilli, the important pathogenic fungi were *Colletotrichum capsici* (97.0%), *Alternaria solani (15.0%), Alternaria alternata* (12.0%), *Fusarium solani* (20.0%) and *Fusarium oxysporum (20.0%)* were recorded in higher percentage in selected samples by Thippeswamy *et al.* (2011). Nahar- Sharfun *et al.* (2004), Nutsugah *et al.* (2004), Sonavane *et al.* (2011) also reported seed borne mycoflora. Hemannavar *et al.* (2009) showed that standard blotter method recorded maximum fungi than 2,4-D and other methods. The results under present study are in agreement with all above workers. Thus it is concluded from the present investigation that blott4er paper method was found best as compared to 2-4D method for recording seed borne fungi. Out of eight varieties Deepika variety had more associationof seed borne fungi. Highest percentage of *Aspergillus* was noted followed by *Colletotrichum*. Blotter paper method was found superior in recording more number of fungal colonies than 2,4-D blotter paper method.

References

Anonymous, 1996. International rules for seed testing. Seed Sci. Tech. 24: 1 335.

Anonymous, 2013. Indian Horticulture data base, National Horticulture Board. pp-17.

Chigoziri, E., E. J. Ekefan, 2013. Seed borne fungi of chilli pepper (*Capsicum frutescens*) from pepper producing areas of Benue State, Nigeria. Agril. and Biology J. of North America 4(4): 370-374.

Hemannavar, V., M. S. L. Rao, Y. Hegde and H. D. Mohankumar, 2009. Status of seed borne incidence of anthracnose of chilli in northern Karnataka and evaluation of seed health testing methods for the detection of *Colletotrichum capsici*. Karnataka J. Agric. Sci. 22(4): 807 809.

Jogi, M. G., D. N. Padule and S. R Kamdi, 2010. Detection of seed mycoflora of chilli and it's impact on seed germination and seedling vigour. International J. of Plant Sci.(Muzaffarnagar) 5(2): 502-504.

Kalyani Kumari, G. C Jadeja and S. T.Patel, 2012. Seed borne mycoflora of chilli (*Capsicum annuum* L.) cultivars collected from different locations of Gujarat. J. of Plant Disease Sciences 7(1): 55-59.

Meon, S. and W. nik, 1988. Seed borne infection and development of *Colletotrichum Capsici* in naturally infected chili seed. Pertanika 11(3): 341-344.

Nutsugah, S. K., L. Vibeke, I. D. K. Atokple and Ayensu, 2004. Seed-borne mycoflora of major food crops in Ghana. Jour. of sci. and tech. 24(2).

Pandey, M., M. Srivastava and R. P. Mishra, 2012. Establishment of seed borne nature of

Alternaria alternata causing leaf spot and fruit rot of chilli. Archives of Phytopathol. and Pl. Pro. 45 (7): 869-872.

Sharfun- Nahar, M. Mushtaq and I. H. Pathan, 2004. Seed borne mycoflora of *Capsicum Annuum*. Pak. J. Bot. 36(1): 191-197.

Sonavane, A. A., B. G. Barhate and S. J. Bade, 2011. Efficacy of bioagents,botanicals and fungicides on seed mycoflora of soybeans. J.Pl.Dis.Sci.Vol.6(1): 74-76.

Telang, S. M., 2010. Effect of extracts of various plant parts on seed mycoflora and seed germination of chilli. Asian J. of Soil Sci. 5(1): 42 45.

Thippeswamy, B., H. V. Sowmya and M. Krishnappa, 2011. Seed borne fungi of Vegetable crops in Karnataka. J. Pl. Dis. Sci. 6(1): 5-10.

Vidhyasekaran, P and C. P. Thiagarajan, 1981. Seed-borne transmission of *Fusarium oxysporum* in chilli. Indian Phytopathol. 34: 211-21.

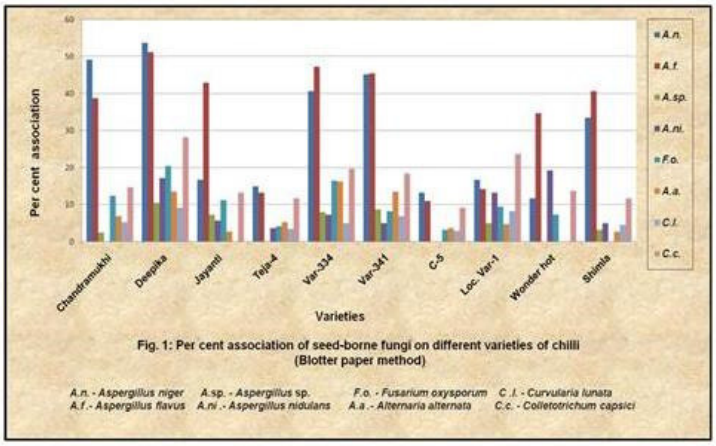

Fig. 1: Per cent association of seed-borne fungi on different varieties of chilli (Blotter paper method)

A.n. - Aspergillus niger *A.sp. - Aspergillus sp.* *F.o. - Fusarium oxysporum* *C.l. - Curvularia lunata*
A.f. - Aspergillus flavus *A.ni. - Aspergillus nidulans* *A.a. - Alternaria alternata* *C.c. - Colletotrichum capsici*

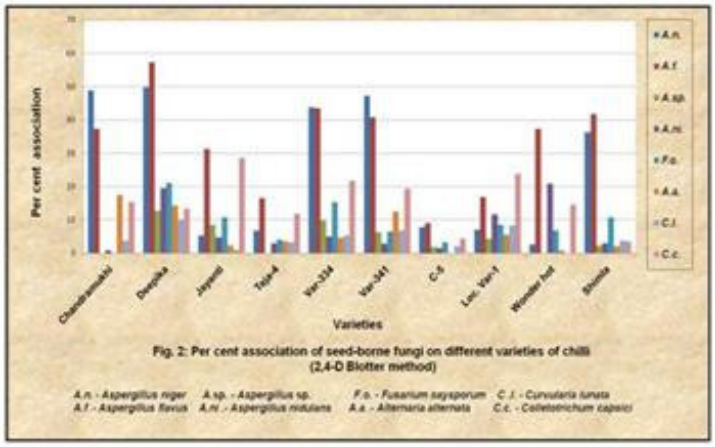

Fig. 2: Per cent association of seed-borne fungi on different varieties of chilli (2,4-D Blotter method)

A.n. - Aspergillus niger *A.sp. - Aspergillus sp.* *F.o. - Fusarium oxysporum* *C.l. - Curvularia lunata*
A.f. - Aspergillus flavus *A.ni. - Aspergillus nidulans* *A.a. - Alternaria alternata* *C.c. - Colletotrichum capsici*

Table No. 1: Per cent association of seed-borne fungi on different varieties of chilli.

A= 2,4-D Blotter method B= Blotter paper method

Sr. No	Variety	*A.n.*		*A.f.*		*A.sp.*		*A.ni.*		*F.o.*		*A.a.*		*C.l.*		*C.c.*	
		A	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**
1	Chandra mukhi	49.25	48.75	38.75	37.25	2.5	0.00	0.00	0.75	12.5	0.00	7.00	17.5	5.25	3.75	14.75	15.25
2	Deepika	53.75	49.75	51.25	57.25	10.5	12.75	17.25	19.5	20.5	21.0	13.5	14.25	9.25	10.0	28.25	13.25
3	Jayanti	16.75	5.25	43.0	31.25	7.25	8.5	5.75	4.75	11.25	10.75	2.75	2.25	0.00	1.00	13.25	28.5
4	Teja-4	15.0	6.75	13.25	16.5	0.00	0.00	3.75	3.00	4.25	4.00	5.25	3.5	3.5	3.25	11.75	11.75
5	Var-334	40.75	43.75	47.25	43.5	8	9.75	7.25	5.00	16.5	15.25	16.25	4.5	5.00	5.25	19.75	21.75
6	Var-341	45.25	47.25	45.5	40.75	8.75	6.25	5.00	2.75	8.25	6.5	13.5	12.5	7.00	6.75	18.5	19.25
7	C-5	13.25	7.75	11.0	9.00	0.00	1.75	0.00	1.5	3.25	3.25	3.75	0.00	3.00	2.00	9.25	4.25
8	Loc. Var-1	16.75	7.00	14.25	16.75	5.00	4.25	13.25	11.5	9.5	8.5	4.75	5.5	8.25	8.25	23.75	23.75
9	Wonder hot	11.75	2.5	34.75	37.25	0.00	0.00	19.25	20.75	7.25	6.75	0.00	0.75	0.00	0.00	13.75	14.5
10	Shimla	33.5	36.25	40.75	41.75	3.25	2.25	5.00	3.00	0.00	10.75	2.75	2.00	4.5	3.75	11.75	3.5

*A.n. - Aspergillus niger A.*sp. *-Aspergillus* sp. *F.o. - Fusarium oxysporum C.l. - Curvularia lunata A.f. - Aspergillus flavus A.ni. - Aspergillus nidulans A.a. - Alternaria alternata C.c. - Colletotrichum capsici*

❖❖❖❖❖