ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 03, 2021

EFFECT OF SELECTED SEED BORNE FUNGI ON SEED GERMINATION AND VIGOUR INDEX OF LEGUMES SEEDS.

Laxman R. Rathod[1*], Dhananjay N. Kokil[2], N. B. Pawar[3] and Gurumeet C Wadhawa[4*]

[1]Dept. of Botany Mahatma Phule A. S. C. College Panvel

[2]Dept. of Chemistry, Mahatma Phule A. S. C. College Panvel

lrathod78@yahoo.com

[3]Dept. of Chemistry, K. B. P. College, Vashi, New Mumbai

Abstract:

The present investigation "Effect of selected seed-borne fungi on seed germination and vigour index of Legume seeds" was conducted during 2006-2007 in the laboratory at Research Center for Advanced Studies in Plant Sciences, P.G. of Department Botany, Shivaji Mahavidyalaya, Udgir Dist. Latur. Legume seed mycoflora, in their order of merit as Blotter paper method and Agar plate methods, were found to be the most effective in seed health testing. Aspergillus flavus and Alternaria alternata were pathogenic and were discovered to negatively influence, seed rot, seed germination, and legume seed vigour.

Keywords: Legumes seed, agar plate technique, blotter paper technique, PDA medium, Alternaria alternata and Aspergillus flavus

Introduction:

The role of seed health in the new star strategy for decelerating food production is being increasingly related throughout the world in general and India in Particular. In agricultural production, seeds are the basic unit, except in the early history when seeds and diseases were interrelated. It has piqued the interest of scientists working in agricultural and traditional colleges in India because of seed pathology. The Indian laboratory has played a critical role in the study of plant-borne viruses that affect tropical crops. Several seed testing laboratories have been set up in India, and more are under construction. The infections in the seed are known as seed-borne pathogens. Mycoflora, which is found in the seeds, can cause many diseases as well as have a negative impact on seed storage, germination, vigour, food value, and yield. In order for crops to be successful, good germination and vigour are necessary for planting and seedling growth. Poor germination and seedling disease are mostly caused by seed-borne fungus that exist alone or in combination (Bora and Gogoi, 1993; Khair et al., 1988; Mathur et al., 1972). The present work was undertaken on Effect of selected seed borne fungi on seed germination and vigour index of seed in Udgir, Maharashtra.

Materials and Methods:

1. Collection of Seed Sample:

Seed samples of Legumes were collected from Pluses Research Center, Badnapur, Agriculture College, market and local places. The following legume cultivar – Gram (Cicer arietinum L.), Pigeon pea (Cajanus cajan (L.), Green gram (Vigna radiate L.) and Black gram (Vign mungo L.) were used in the study. The externally and internally seed borne fungi is identified or detected by Agar plate method. Doyer (1938), De Temp (1953) and International Seed Testing Association (ISTA, 1996), Muskett, 1948 were first to adopted blotter paper and Agar plate in seed health management.

2. Blotter paper method

a) Materials required:-

Sterilized petriplate, Blotter paper the size petriplate, Forcep, Steril distil water, Woolen, Stage microscope, Legume seed i.e. Pea, Spore suspension of Alternaria alternate and Aspergillus flavus , Incubation chamber, Beaker.

b) Procedure for Blotter Paper:-

Take blotter and petriplates write the sample no and date with pencil or ball pen. Dip the blotters in the sterilized water with the help of forceps. Keep the blotter in vertical position to remove excess water. Place the blotter in petriplate. Take 8 seeds and deep spore suspension of Alternaria and place with the help of forcep on blotter papar of petriplate. 6 seed in outer ring 2 seeds in the center. In case of small sized seeds take 15 seeds. Cover the plates and write sample no day and date and dish no on the cover. Keep the seed in the name is an another petriplate. Without using spore suspension. This will continued as control. Keep the plates in the incubation chamber at 28 $\pm$ with the cycle of 12 hrs. light 12 hrs darkness. Examine the seeds in petriplate at 8 after a day. Examine the seeds outer ring first then the seeds on the centre of plate. After this recode the result and observation. Note the length of radicle, length of plumule % of germination and vigour index caluculated by formula vigrur index = (Length of radicle + Length of Plumule) X % of germination. The vigor of the seedlings were determined by following the formula of Baki and Anderson (1972) where,

Vigor index = (Mean of root length + Mean of shoot length) x Percentage of seed germination.

B) Agar – plate Method:–

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 03, 2021

a) Material Required:

PDA medium, Sterilized petriplates, Sterilized distilled water, Force , Seed sample i.e. pea, Autoclave, Beaker, Inoculating chamber with UV light, Spore suspension of Alternaria alternate and Aspergillus flavus

c) Procedure for Agar- plate:-

Prepare a GNA medium. Take 12 petriplates which are sterilized. Sterile the GNA medium and petriplate in Autodove. After sterilization cool the medium and pour 15 ml of GNA medium in each petriplates. Allow the medium solidity for some time. Place 10 seed per plate at equal distance this will be control deep the seed in spore suspension & Place the seed on agar plates. Incubate the petriplates at 25^0 c temp with 12 hrs. Darkness and 12 hrs light. Examine the plate after 8 days of incubation Note % germination, Length of radicle and length of plurrule and vigour index. Vigour index = (Length of radicle and length of plumule) X % of germination. After this record the observation and results.

c) **Chemical composition of PDA Medium:**

Potato	–	200 g
Dextrose	–	20 g
Agar	–	20 g
Distilled water	–	1000 mL
pH	_	5.6

3. Spore Suspension:-

PDA or GNA slant culture was combined with sterile distilled water, then 10 mL of the resulting suspension was used to prepare the spore suspension. In all experiments, 5 mL of this solution was employed as inoculum. There was a uniform spore suspension of 0.8 O.D. (Optical Density). The researchers conducted all the experiments in triplets and reported the results.

4. Incubation:

A fluctuation in temperature was detected while the cultures were cultured at 270C and 20C in the laboratory. The incubation times in all the trials were 7 to 10 days.

Experimental Results:

Table 1: Effect of spore Suspension of A. alternata on % germination of Legumes seeds in blotter paper methods

Sr.No.	Treatment	% of germination	Length of Radicle	Length& plumule	Vigour index
1	Spore Suspension of A.alternata	50%	15 cm	5 cm	1000
2	Control of sterile distil water	60%	20 cm	10 cm	1800

Table 2: Effect of spore Suspension of Aspergillus niger on % germination of Legumes seeds in blotter paper methods

Sr.No.	Treatment	% of germination	Length of Radicle	Length& plumule	Vigour index
	Spore Suspension of Aspergillus niger	60%	20 cm	7 cm	1600
	Control of sterile distil	75%	30 cm	9cm	2925

Table 3: Effect of spore Suspension of Alternaria alternata on % germination of Legumes seeds in Agar plate methods

Sr.No.	**Treatment**	**% of germination**	**Length of Root**	**Length of shoot**	**Vigour index**
1	Spore suspension of Alternaria alternata	80%	19 cm	9 cm	2240
2	Control of Sterile. D.W.	90%	20 cm	10 cm	2700

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 03, 2021

Table 4: Effect of spore Suspension of Alternaria alternata on % germination of Legumes seeds in Agar plate methods

Sr.No.	Treatment	% of germination	Length of Root	Length of shoot	Vigour index
1	Spore suspension of Alternaria alternata	85%	23 cm	10cm	2805
2	Control of Sterile. D.W.	90%	25 cm	13 cm	3420

In blotter paper method it was found that the length of root, length of shoot (plumule), percentage of germination and vigour index was found to be more in control as compared the seeds treated with seed borne fungus. In blotter paper method the vigour index were 1800 and 1600 in control and in seeds treated with fungus were 1000 and 2925 (Table 1 & 2).

In Agar plate method it was found that the length of root, length of shoot, percentage of germination and vigour index was found to be more in control as compared the seeds treated with seed borne fungus. In Agar plate method the vigour index were 2700 and 2805. In control and in seeds treated with fungus was 2240 and 2805 (Table 3 & 4).

Discussion:

The method described by Muskett (1948) helps find seed-borne fungus that may be present. Seed health testing was studied using a blotter paper method by De Tempe (1953). From Christensen and Kaufmann, from Christensen and Kaufmann (1965). Long-term deterioration of stored grains was found to be due to fungi. There are also Barnett and Hunter (1972). illustrated imperfect fungi genera Established by Mathur et al. (1972) is the fact that Trichoconis padwickii infested rice causes infection. The Physiological and Biochemical Deterioration of Seeds by Baki and Anderson (1972) Seed-borne infection of rice by Drechlera oryzae was noted by Rath (1974). two classics from the Comoros: Ashokan and Emaravarmban (1979). Germination is supported by seed-borne fungi, and rice's post-emergence mortality is due to fungi that developed during the germination process. A comparison was conducted by Mia MAT and Mathur (1983) on seed mycoflora of rice in Bangladesh. Work was done by Mian IH and Fakir GA (1989). As the moisture level of rough rice grains increases, their capacity to resist the spread of mould and mildew decreases. from two time periods. Saudi Arabian rice seed-borne fungus During the study conducted by Bora and Gogoi (1993), it was found that seed quality of deep-water rice was negatively impacted by seed-borne microbiota in Assam. Surveying seed-borne pathogens of rice in Bangladesh in fifteen areas revealed that. Agarwal and Sachan (1994). The seed borne inoculum, germination, and seedling vigour were studied while testing several seed treatment techniques on rice seeds with stained seeds. Researchers Deka and Ali (1995) discovered seed-borne fungal germination occurring in the grains of rice. Anahosur Yashoda and Yashoda's foster child (2000) Cumulative effect of rice fake smut on growth metrics and yield components. International Journal of Phytoremediation 8(2) 245-253. The Seedborne Mycoflora of Legume Seeds were identified by Rathod, et al. (2010). Seed-borne mycoflora (of Gram seeds) was described by Laxman Rathod (2020). (Cicer arietinum L.).

References :

1. Alexopolus E. J, Mims, C.W. Blackwell, M. Introductory Mycology, Willy publication, 2017; 4: 4.
2. Ashokan A, Ramabadran R and Emaravarmban N (1979). Influence of seed borne fungi on germination and post emergent mortality of rice (ADT 31) and Ragi (C 0.7) seeds. Indian Journal of Microbiology 19(4) 232-234.
3. Aslam MF, Irshad G, Naz F, Aslam MN and Ahmed R. Effect of seed-borne mycoflora on germination and fatty acid profile of peanuts. Pakistan Journal of Phytopathology, 2015; 27(2): 131-138.
4. Baki AA and Anderson JD (1972). Physiological and biological deterioration of seeds. In. Seed Biology, II, (Academic Press, New York, USA) 283-315.
5. Barnett, H., Hunter, D. B. (1972). Illustrated Genera of Imperfect Fungi. Burgess Publishing Company in Tamilnadu, India. Mycology Progress. 4: 195–204.
6. Bokhary HA (1991). Seed-borne fungi of rice from Saudi Arabia. Seed Pathology and Microbiology 98(3) 287-292.
7. Bora LC and Gogoi R (1993). Estimation of seed quality deterioration of deep water rice by seed-borne microflora in Assam. Indian Journal of Mycology and Plant Pathology 32(2) 214- Christensen CM and Kaufmann HH (1965). Deterioration stored grains by fungi. Annual Review of Phytopathology 3 69-81.
8. De Tempe. The blotter method of seed health testing. Proc. Int. Seed test Assoc., 1953; 28: 133-151.
9. Deka B and Ali MS (1995). Rice grain fungi occurrence and role over storage seed. Plant Health 1 26-28.
10. Doyer LC. Manual for the determination of seed- borne disease. Wageningen, netherland: International seed testing Association, 1938; 59.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 03, 2021

11. Islam MR, Ali A and Mia MAT (1994). Survey on seed-borne pathogens of rice in fifteen districts of Bangladesh. Bangladesh Journal of Plant Pathology 10(12) 23-26.
12. ISTA. (International seed testing association). International rules for seed testing rules. Seed Science and Technology, 1996; 24: 1-335.
13. Jha DK. A text book on seed pathology. Vikas publishing house pvt. Ltd. New Delhi, 1993; 132: 1995.
14. Laxman R. Rathod (2020). Seed Borne Mycoflora of seeds of Gram (Cicer arietinum L.). World Journal of Pharmacy and Pharmaceutical Sciences. Volume 9, Issue 8, 1031-1037.
15. Mathur SB, Mallya JI and Neergaard P (1972). Seed borne infection of Trichoconis padwickii in rice and damage to seeds and seedlings. Proceedings of International Seed Testing Association 37(3)803-810.
16. Mia MAT and Mathur SB (1983). Study on seed mycoflora of rice in Bangladesh. Seed Research 11(2) 254-257.
17. Mian IH and Fakir GA (1989). Fungi, moisture content and germ inability of rough rice grains during storage. Seed Research 17 169-173.
18. Muskett AE. Technique for the examination of seeds for the presence of seed borne fungi. Trans. Brit. Mycol. Soc, 1948; 39: 74-83.
19. Rath GC (1974). Effect of seed-borne infection of rice by Drechlera oryzae on the grain weight, germination and emergence of high yielding varieties of rice. Scientific Culture 40 156-159.
20. Rathod, L. R, Jadhav MD, Mane SK, Muley SM and Deshmukh PS. (2012). Seed Borne Mycoflora of Legume Seeds. International Journal of Advanced Biotechnology and Research, 3(1): 5.
21. Sachan IP and Agarwal VK (1994). Efficiency of seed treatment of discolored seeds of rice on seed borne inoculum, germination and seedling vigour. Seed Research 22(2) 45-49.