

Title of the Thesis	:	Eco-pathological study of seed mycoflora and its impact on biodeterioration of <i>Phaseolus vulgaris</i> L. in Himachal Pradesh
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ABSTRACT

Seventy three seed samples of kidney bean collected from various agro-ecological situations when analysed for seed health, mycoflora and seed quality parameters revealed the presence of thirty six species of fungi belonging to twenty four genera detected by blotter, agar plate and seed component plating technique. Both storage and pathogenic fungi were recorded and included the species of *Acremonium*, *Alternaria*, *Aspergillus*, *Botrytis*, *Cephalosporium*, *Cladosporium*, *Colletotrichum*, *Fusarium*, *Gliocladium*, *Helminothosporium*, *Heterosporium*, *Macrophomina*, *Monosporium*, *Myrothecium*, *Penicillium*, *Phoma*, *Phymatotrichum*, *Rhizoctonia*, *Stemphylium*, *Sclerotinia*, *Sclerotium*, *Trichoderma*, *Trichothecium* and *Varicosporium*. The number of fungi detected from individual seed samples ranged between one to sixteen species whereas, some were free of any infestation. Various seed fungi were located on different parts of seeds, though maximum mycoflora was noticed on seed coat followed by cotyledons. Along with some pathogenic fungi *Aspergillus flavus* and *A. niger* were also recorded on embryonic axis. Freshly harvested seeds were found to harbour more mycoflora than stored seeds and samples collected from Zone IV possessed minimum fungi. Spore suspension and culture filtrates of pathogenic fungi induced identical symptoms, however, spore suspension of storage fungi did not affect seed germination and had no adverse effects whereas, their culture filtrates induced root and stem rot symptoms besides reducing germination. Storage studies revealed that storage containers had no significant effect on seed health however the seed mycoflora was affected. Metallic bins proved to be best storage containers as seed stored in them harboured less mycoflora in comparison to gunny bag and polylined bag stored seeds. The frequency of storage fungi increased with storage period and pathogenic fungi were replaced by storage ones. Biochemical analysis with regard to effect of the mycoflora on the seed revealed that protein and free fatty acid contents showed increase in infected seeds over control and decrease in carbohydrates. Thereby, indicating significant loss of nutrients in infected seeds. Management studies of seed mycoflora revealed that various fungicides applied @ 2, 2.5 and 3 g/kg seed resulted in significant reduction of

the health status of bean seeds. Bavistin, Thiram and Bavistin + TMTD were found to be most effective. However, application of propionic acid alone and in combination with Bavistin reduced the seed germination drastically including other seed health parameters without any significant effect on mycoflora. Seed coat colour was found to affect the occurrence of mycoflora during storage as dark coloured (black and maroon) varieties harboured less fungal flora as compared to brown and white seeded varieties. Vegetable type of beans were more liable to attack of various fungi as compared to pulse type varieties which are probably more hardy.

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