

Chapter I
Introduction

Seed is fundamental unit of plant. Improvement and propagation of agricultural crops depends on healthy seeds. Infected and abnormal seeds are a major limiting factor in crop production. Un-healthy seeds lead to poor germination, growth, vigour and yield. Seed harbors a considerable high amount of several fungi responsible for various seed-borne disease and damage (Varshney, 1990). The knowledge of pathogens, saprophytes and other aspects of seed-borne diseases is useful to minimize losses due to such pathogens during seed production and storage. Studies on seed-borne pathogen therefore have achieved great importance in modern agriculture.

Study of transmission of plant pathogen seeds came relatively late in the history of plant pathology. Prevost (1807) proved that sticking but was caused by a parasitic fungus. Chen (1920) published a monograph on internal fungal parasites of agricultural seeds. Dorogin (1923) published a system for detection of seed-borne pathogen associated with various crop seeds in the Russia. In 1924, analysis of crop seeds for plant pathogens was made compulsory in the Russia. Orton (1931) and Porter (1949) published a list of seed-borne pathogens from the U.S. and the damage caused by them. An annotated list of seed-borne diseases was published by Noble *et al.* (1958). Until the 1970's seed pathology was restricted to isolation and identification of fungi, bacteria and viruses associated with seeds and the development of uniform seed analysis techniques for seed certification and certification and quarantine. Paul Neergaard is considered the father of seed pathology. Neergaard (1977) defined seed pathology as the science and technology dealing with seed-born diseases. An annotated list of seed-borne diseases was revised in 1979 by Richardson. The science of seed pathology

has more attention and appreciation since 1980 and is recognized as an important discipline within plant pathology.

According to Agarwal and Sinclair (1993), any infectious agent which is associated with seeds having the potential of causing diseases of a seedling or plant should be termed as “seed-borne pathogen”. This term includes all plant pathogenic fungi, bacteria, viruses, nematodes and other microorganism which are carried in or on seeds & diseases caused by them are called as “seed-borne diseases” and fungi associated with the seeds are called “seed-borne pathogen”. Seed borne pathogen is a term indicating the association on fungi, with the seed, easily penetrating into the seed to cause instant death or delayed systemic infestation of the emerging seedlings (Neergaard, 1977).

According to Christensen (1957), microorganisms falls under two major categories, first is Field microorganism and second is Storage microorganism. Grouping is based on the fungi that occur in seeds. Field fungi are those which get deposited from field on a seed that are exposed right from the time to fertilization, this group is mostly reported on cereals, pulses, oil seeds and vegetable seeds. Storage fungi (microorganisms) are those that develop on seeds during the process of storage of seed. The seeds of leguminous crops do have exclusively storage microorganisms, since their seeds are enclosed in pods. It is only when they are shelled and stored, that fungal and other microbial inoculua get deposited on their surface. The seeds of cereals, pulses, oil seeds and vegetable seeds contains both field and storage fungi. During storage, other factors like the conditions of storage, e.g. temperature, moisture etc. also play a significant role in the seed microbial population (Thoke, 1989).

Neeeregaard (1977) has described various diseases as disorders of seeds. They are : - .

1. Seed abortion;
2. Shrunken seeds, reduced seed size;
3. Seed rot;
4. Sclerotisation or stromatisation of seed;
5. Seed necroses;
6. Seed discoloration;
7. Reduction or elimination of germination capacity and
8. Physiological alterations in seed.

1. **Seed abortion** : In this disorder seeds formed are abortive. Smut fungi and ergot fungi cause seed abortion. Important pathogens causing seed abortion are *Gloeotinia temulenta* and *Fusarium* sp. in cereals like wheat, maize and rice.
2. **Shrunken seeds, reduced seed size** : This disorder is characterized by poor development of seeds in size (reduced seed size) and seeds remain shrunken. It is common in oil seeds. Due to high incidence of *Fusarium moniliforme* the seed size is reduced in sorghum.
3. **Seed rot** : It is characterized by rotting of seed, either on the crop or during germination. Seed rot in cereals is caused by *Fusarium* and species of *Drechslera* caused seed rot in different crops.
4. **Sclerotisation, stromatisation of seed** : It is the transformation of floral organs or seed into sclerotia or stromatisation of seed. e.g. Ergot produced by *Claviceps purpurea*.
5. **Seed necroses** : It is in the form of necrotic patches. *Collectotricum* spp., as well as *Ascochyta* spp., often penetrate into the fleshy cotyledons, producing

conspicuous necrotic lesion in seeds of bean, soybean, pea, chickpea, cowpea and other hosts.

6. **Seed discoloration** : It is nothing but discoloration of seed. it is a very important degradation factor. Such disorders may indicate that seed is transmitting pathogens and hence are not good for planting. There are three categories of seed discoloration, a) Superficial necrotic lesions. B) Fungus coatings and c) Pigmentation.
7. **Reduction or elimination of germination capacity** : It is the effect of seed pathogen. Necroses or deeply penetrating rots reduce the seed viability longevity in storage and emergence in field.
8. **Physiological alterations in seed** : Primary as well as secondary metabolites of seed-borne microorganisms affect the seed. these might cause toxicity to human and animals. *Aspergillus flavus* which produces aflatoxins in ground and other seeds is toxic and carcinogenic.

It is necessary to know the seed borne pathogen and its proper control measures to increase the crop production and to fulfill the requirement of flood. In the seed certification schemes the main purpose of seed treatment should be to control infections or contaminations. It is simple technique to assess seed health. The botanists and agriculturists study seed borne pathogen and their effect on the seed production and control measures of seed borne pathogen. By using the standard seed health testing methods farmers can improve production and quality of plants.

Title of present investigation is “**Study of seed borne fungi in groundnut and gram from Satara district**”. Satara is a one of the districts of Maharashtra, located at foot of Sahyadri ranges towards the western side. Satara

district is spread over 10580 sq.km. area. Major crops of the cereal, pulses, oil seeds and vegetables groundnut and gram crops are the major crops. Groundnut is a oil seed crop. Various seed borne diseases are Tikka disease, Collar rot, crown rot disease, seedling blight disease, rust disease. Gram is pulse crop. Various major seed borne diseases are, blight disease, rust disease, wilt disease.

Therefore aim of present investigation for field survey, control seed borne fungi and control blotter method is done.