INTRODUCTION

Cultivation of food grains for consumption by man started in the Neolithic period of the Stone Age (about 8000 B.C.). Storage has been a necessity ever since man started cultivation, as the produce is seasonal, but its consumption is spread throughout the year (Mehrotra 1992). The importance of seed storage however, goes much beyond consumption, because good seeds are the basis of any agricultural programme. There is thus, no doubt that seed storage is an important aspect of any sound seed programme. Stored seeds will not be of much help if on planting, they do not yield healthy and vigorous plants (Saxena *et al.*, 1992). About 90% of world food crops are grown and propagated by seeds. The seed quality is greatly affected by the prevailing environmental conditions, as well as the time the seeds reach physiological maturity from harvest.

Seed storage is greatly influenced by the temperature and relative humidity. In a tropical country like India, the problem of storage is aggravated by weather. Conditions of both high temperature and humidity, with tremendous increase in production of grains over the years, and the increasing need to feed the ever increasing population of man and cattle, storage of grains has to be on a larger scale than ever before. Often a substantial amount of produce is lost between harvest and consumption, essentially in countries where proper storage facilities do not exist.

Deterioration of seeds is brought about by microorganisms. Among the microorganisms responsible for microbial deterioration of seeds, fungi are, by far, the most important, as they possess the greatest seed infecting ability (Mehrotra, 1992). Fungi associated with seeds may be the pathogenic ones which on germination transmit the diseases systemically to the new plants. A majority of fungi associated with seeds, on the other hand, are those from the atmosphere which colonize the seeds during storage. These do not cause plant diseases, but deterioration of seeds. Some of these also secrete toxins, which are harmful, if consumed.

Pulses are consumed in India, next only to cereals. Being protein rich, these form the diet of a majority of Indians, who are pre-dominantly vegetarians. Some of the major pulses grown in India are mung bean, pigeon pea, pea, lentil, black gram etc. *Cajanus cajan* (L.) Millsp., commonly called as pigeon pea, is one of the most common pulses cultivated in India. It probably originated in India, but may have come from Africa. It is clear that the species has been under cultivation for a long time and was spread by traders, thousands of years ago. Today, pigeon pea is cultivated throughout the tropics and has naturalized in many other regions. Pigeon pea (Arahar) is an important food in developing tropical countries, including India. Being an excellent source of protein, the seeds are consumed in several forms. Among world cultivation about 88% is cultivated in India. *Lens culinaris* Medik, commonly known as lentil is one of the oldest known pulses. Intensively cultivated from the earliest days of civilization, lentils have been found in Egyptian tombs dating back to 2200 B.C. though their cultivation goes back atleast 8000 years. Lentils are also cultivated widely in India, and the seeds are consumed in several preparations. Among the legumes, lentils are the richest in protein, iron and vitamin B_2, and lowest in fat. Mung bean, *Vigna radiata* (L.) Wilczek is also one of the most important pulse crops. It is grown in almost all parts of the country. It is an excellent source of high quality protein. It is consumed either sprouted, or cooked in various ways. Ascorbic acid (Vit. C) is synthesized in sprouted seeds of mung bean with increment in riboflavin and thiamin. The centre of origin of mung bean is believed to be India. It is grown throughout the southern Asia including India, Pakisthan, Bangladesh, Sri Lanka, Thailand, China etc. and has extended to parts of Africa, USA and Australia.

It is quite natural that all the above pulses are stored extensively, either to be used for cultivation in the next season, or to be consumed as food (Plate I). Storage of seeds are known to cause bio-deterioration due to the association of fungi, and hence, the present study was undertaken to determine the extent of association of storage fungi with the three pulses and

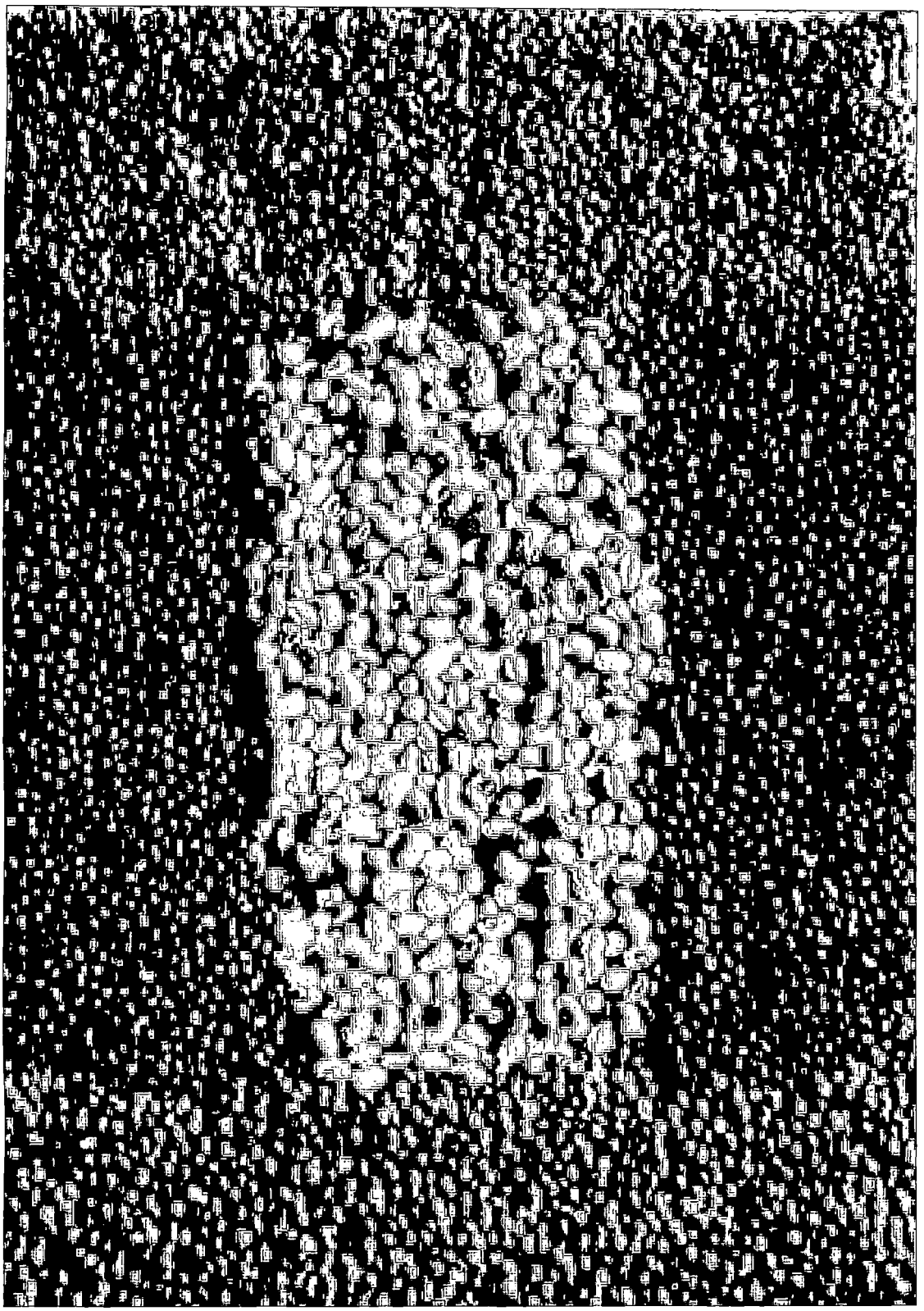

Plate-I: Seeds of pulses

the bio-deterioration caused by these. The main objectives of the present investigation has been:

(i) To isolate the fungi associated with stored seeds of different pulses- Mung bean (*Vigna radiata*), Arhar (*Cajanas cajan*) and Lentil (*Lens culinaris*), (ii) To identify the fungi and select a few most commonly occurring ones from each type, (iii) To determine the effect of specific fungi an seed germination and seedling growth, (iv) To determine changes in protein contents and carbohydrates in the seeds following seed treatment with the fungi, (v) Determination of changes in enzyme activities of seeds and seedlings due to storage fungi, (vi) SDS-PAGE analysis of proteins to determine changes in protein pattern, (vii) Preparation of antigens of fungi and raising of antisera against one selected fungus each from each seed, (viii) Detection of the fungus in the seeds by DAC ELISA using the antisera.