CHAPTER I

GENERAL INTRODUCTION
Forests are the major natural resources for supply of most of the requirements of men on this planet like fuel, food, clothing, stationery, medicines, fodder for livestock animals and other industrial products. In addition to providing and fulfilling these daily needs of human beings, these conserve the global environment by binding soil, providing oxygen by consuming $\text{CO}_2$ and play an important role in the climatic characteristics of the surrounding area. About half of the world’s forest are located within tropics in three main regions namely tropical Africa, tropical America and Asia-Pacific region. In broad terms, the total estimated area of tropical forests is over 2000 million hectares, of which about 850 million hectares can be regarded as tropical rain forest. It is commonly believed that the tropical forests play an important role in global ecology and are of vital importance in maintaining environmental quality far beyond the confines of the tropics (MAB, 1972). In our country, about 74.9 million hectares of the land is covered by different forests, of which most of the area is supported by dry and moist deciduous forests. A major portion of these forests is found in Madhya Pradesh (17.30 million hectares). Among these various type of forests, dry deciduous forests endure long dry period annually and therefore, their regeneration remain poor.

Many fold increase in human population together with the industrialization and modernisation of society created
tremendous demand for energy, food and shelter. These demands of today's society, mainly for their luxurious and materialistic life, have posed a potential threat for the existence of different types of forests, by harvesting forests for fuel and other daily needs, clearing forest lands for cultivation of agricultural crops, constructing big dams for irrigation and generation of hydroelectric power, and by replacing forests by cemented houses for shelter. While these activities of humans has resulted in disappearance of large tracts of forests disturbing the climate and its behaviour; it has also caused heavy erosion of soil resulting into recurrence of devastating floods and loss of the top soil. This heavy intrusion of humans into forests have appreciably disturbed the ecological grazing food chain and caused extinction of wild life from many parts of the globe. These alarming trends of development have lately attracted the concern of scientists, administrators, politicians and layman alike, which resulted into a new generation of conservators and ecologists who are concentrating their efforts to check further damage to these ecosystems and to restore the faded forest areas at national and international levels. Some of the international organizations like International Union for Nature and Natural Resources (IUCN) and UNESCO, through Man and Biosphere Programme, are doing their utmost by persuading national governments to initiate various laws and punitive measures to check deforestation, and to initiate the researches for the restoration of forests.
The success of afforestation and reforestation programmes depends appreciably upon the understanding of the species composition, interaction among different species and their environment. Because the better understanding of structure and function of a forest ecosystem in question may lead to the identification of fast-growing species and the species with commendable capacity to bind the soil. The second step for these programmes involves the study of behaviour of seed and its germination, and the means for fast germination of the seeds. The third step which is very crucial deals with the study of seedling growth and the media and other environmental factors which can facilitate its faster growth with subsequent maintenance of these seedlings in nursery. These aspects of afforestation and reforestation have been paid due attention in European and North-American countries. The ecologists made good progress by long term, well planned and exhaustive field studies towards the understanding of their forests. Their efforts have been quite successful in generating vast stretches of artificial forests and regeneration of natural forests in a vast area. Although, good amounts of studies have been performed on the dynamics and structure of tropical rain forests and deciduous forests. These endeavours could not get so much success as those of temperate regions. This may be well understood by the complex nature of tropical forests which are more dynamic and highly diverse in nature. These forests have also
reached a climax stage in most of the cases, making their regeneration or introduction of a new species very difficult unlike temperate forests which are less dynamic, less diverse and most of these have not attained the climax stage. Moreover, the climate in tropics make these forests quite unaccessible for field studies.

A substantial amount of work has been carried out and is still continuing on tropical forests, especially dry deciduous forests of central India, to understand the structure and functioning of these ecosystems. Some notable contributions on local forests are made by Misra and Joshi (1952); Bhatia (1954, 1958), Sakeena (1955), Mishra (1961), Bhatnagar (1968), Sodhia (1974), Kandya (1974), Dakwale (1975), Prasad (1976), Johri (1977), Nayak (1977), Joseph (1977), Yadav (1978), Athaya (1980), Baines (1980), Khare (1981), Khare (1981), Mishra (1983). These studies have mainly dealt with the structure and function of the forests. The relation of different species to their environment, dynamics of species growth and nutrient cycling, and the effect of fire and other biotic interferences on the structure and composition of these forests. Those studies are few which pertain to the understanding of germination behaviour of seeds and the factors which affect or favour it, and to obtain the knowledge regarding the growth and dynamics of seedlings in its initial phase and the media and other environmental variables which can help in
their sustenance, fast growth and maintenance in nurseries. The work of Baines (1980) and Mishra (1983) have slightly touched some of these aspects.

The present study was conceived to fill this gap in the knowledge of seed germination and seedling growth of some local tree species to some extent by studying the following aspects:-

- Effect of imbibition, litter leachate, potting media and other environmental variables on the germination of seeds/fruit.
- Screening of the seedling characteristics of some important tree species,
- Effect of potting media on growth and behaviour of different components of the seedlings; and
- Analysis of growth dynamics of the seedlings during their initial growth phase.