General Introduction
Arunachal Pradesh is the 25th state of India which attained its statehood on 20th February, 1987. It is situated in the North Eastern part of India with 83,743 sq kms area and has a long International boundary with Bhutan to the west (160 km), China to the north and north east (1080 km) and Myanmar to the east (440 km). It stretches from the snow capped mountains in the north to the plains of Brahmaputra valley in south. Arunachal Pradesh is the largest state area wise in the North-Eastern region of India. Biogeographically it is in the Eastern Himalayan zone, situated between 26° 28’ North latitudes and 97° 30’ East longitudes, and one of 12th hot spots of biodiversity of the World. The entire territory forms a complex hill system of varying elevations ranging from 50 msl in the foothills and gradually ascending to about 7000 msl, traversed throughout by a number of rivers and rivulets including origin of Brahmaputra, the largest river of India. Rainfall varies from 1000 mm in higher reaches to 5750 mm in foot hills, spread over 8-9 month except during drier days in winter. Diversity of topographical and climatic conditions have favoured the growth of luxuriant forests which are home to a myriad of plant and animal species adding beauty to the landscape.

This richness of life forms, i.e, flora and fauna that occur in these forests presents a panorama of biological diversity with over 5000 plant species, about 85 terrestrial mammal species, over 500 species of bird and a host of species of butterflies, insects and reptiles. Such an unparallelled occurrence of life forms can be attributed to the peculiar location of the state, which is at the junction of the palearctic, Indo-Chinese and Indo-Malayan biogeographical regions. Biotic elements from all these regions occur in this state making it very rich in biological resources. Arunachal Pradesh has a very rich forest resource with 61.5% of total state (forest
The vegetation of Arunachal Pradesh can be classified into five broad forest types with a sixth type of secondary forest. These are tropical forests, sub tropical forests, pine forests, temperate forests and alpine forests. In degraded forests bamboo and other grasses are of common occurrence.

India is one of the twelve mega biodiversity regions with 7.7% genetic resources of the world. The most diversity rich regions of India are North-East (area 5.2%) and Western ghats (4.0%). The two regions together harbour wild relatives of a number of cultivated plants and animals including microscopic multicellular invertebrates. Nematodes are also one of them. They are a successful group of animals placed at a rather low level of taxonomic hierarchy in the animal kingdom. They occupy any niche that provides an available source of organic matter in marine, freshwater or terrestrial environments. They perhaps represent the planet's most abundant metazoan; of every five animals; four are nematodes (Platt, 1994; Bongers & Ferris 1999). In marine sediments and terrestrial soils, they may be several million per square meter, which is in order of magnitude larger than all other animals put together.

The phylum Nematoda is characterized by high species diversity. Though about twenty-five thousand or more species are known, the most conservative estimates put the number of nematode species to about 500,000. The nematodes are not only numerically abundant but they also show diversity in terms of species. At a single site species richness is high with an average of 30-60 species per soil sample. The nematodes dominate in number as well as species over all other soil-inhibiting animals collectively and occupy all possible habitats. They feed on most organisms but also serve as food for many others. They also influence the vegetation succession.

The Natural forest region of Arunachal Pradesh are rich in humus and organic constituents, harboring a variety of soil invertebrates including numerous interesting
nematode species. Though this state is one of the richest areas in term of biodiversity among North-Eastern states of India, yet very little is known about nematode fauna of this region. A systematic study of nematodes of this area was the need of the hour, and keeping this in mind, the present work was undertaken.

The present thesis has been divided into two parts:

**Part I** deals with the community structure of soil-inhabiting nematodes from three regions (Itanagar, Tirap and Tawang) of Arunachal Pradesh. These three regions are divided on the basis of their elevation, forest types and temperatures during the year. A comparative study of the nematode fauna of these three regions has been done.

**Part II** of the thesis deals with the systematic study of the terrestrial nematodes found in these regions. Since large number of nematode species representing many Orders were collected, it was beyond the scope of this thesis to describe all species recorded here. Hence, a detailed taxonomic study of only the nematodes belonging to the order Dorylaimida has been done here for the purpose of this thesis. A complete list of all the soil-nematode genera recorded during this study has also been provided.