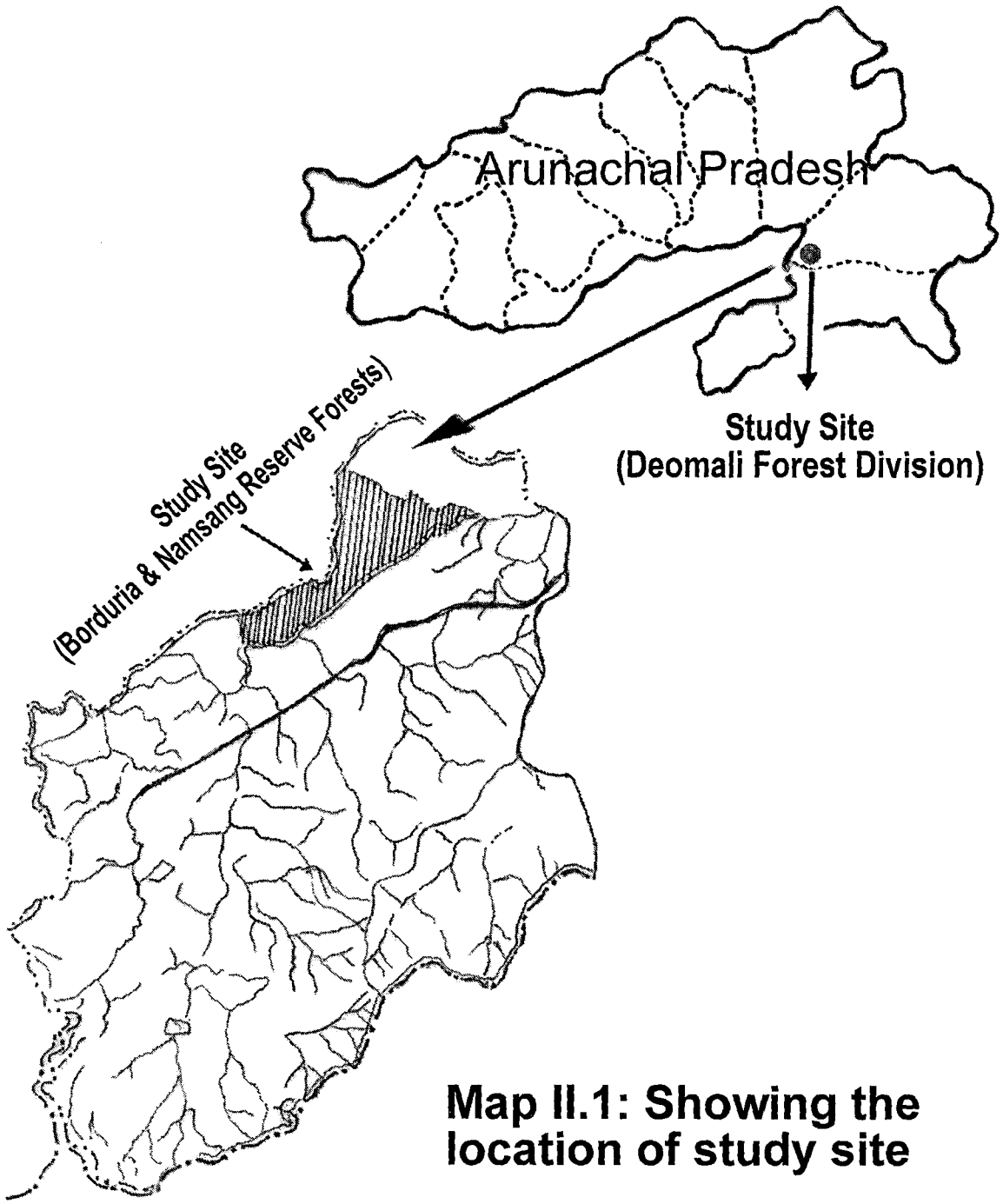
CHAPTER II

The Study Sites: Climate, Soil and Vegetation

Field Studies:

Four forest stands growing in Deomali Forest Division (27° 3′ and 27° 13′ N 95° 22′ and 95° 37′ E; altitude 200 m) in Arunachal Pradesh, north eastern region of India were selected for study. All the four forest stands are classified as wet evergreen *Dipterocarpus* forests (Kaul & Haridasan 1987) and correspond to Champion and Seth's (1968b) IB/CI Assam Valley tropical evergreen forests. All the stands are situated within a circle of 5 km radius (mapII.1, plate II.1).

These forest stands are exposed to various kinds of disturbances such as tree felling, occasional burning and grazing. Commercial crops e.g. coffee, tea, piper etc. are also cultivated within these forest stands. For the purpose of the present study the four forest stands were classified on the basis of a disturbance index (the basal area of the cut trees measured at ground level expressed as a fraction of the total basal area of all trees including felled ones (Rao *et al.* 1990) into highly disturbed (disturbance index 70%), moderately disturbed (disturbance index 40%), mildly disturbed (disturbance index 20%) and undisturbed (disturbance index 0%) categories.



Map II.1: Showing the location of study site

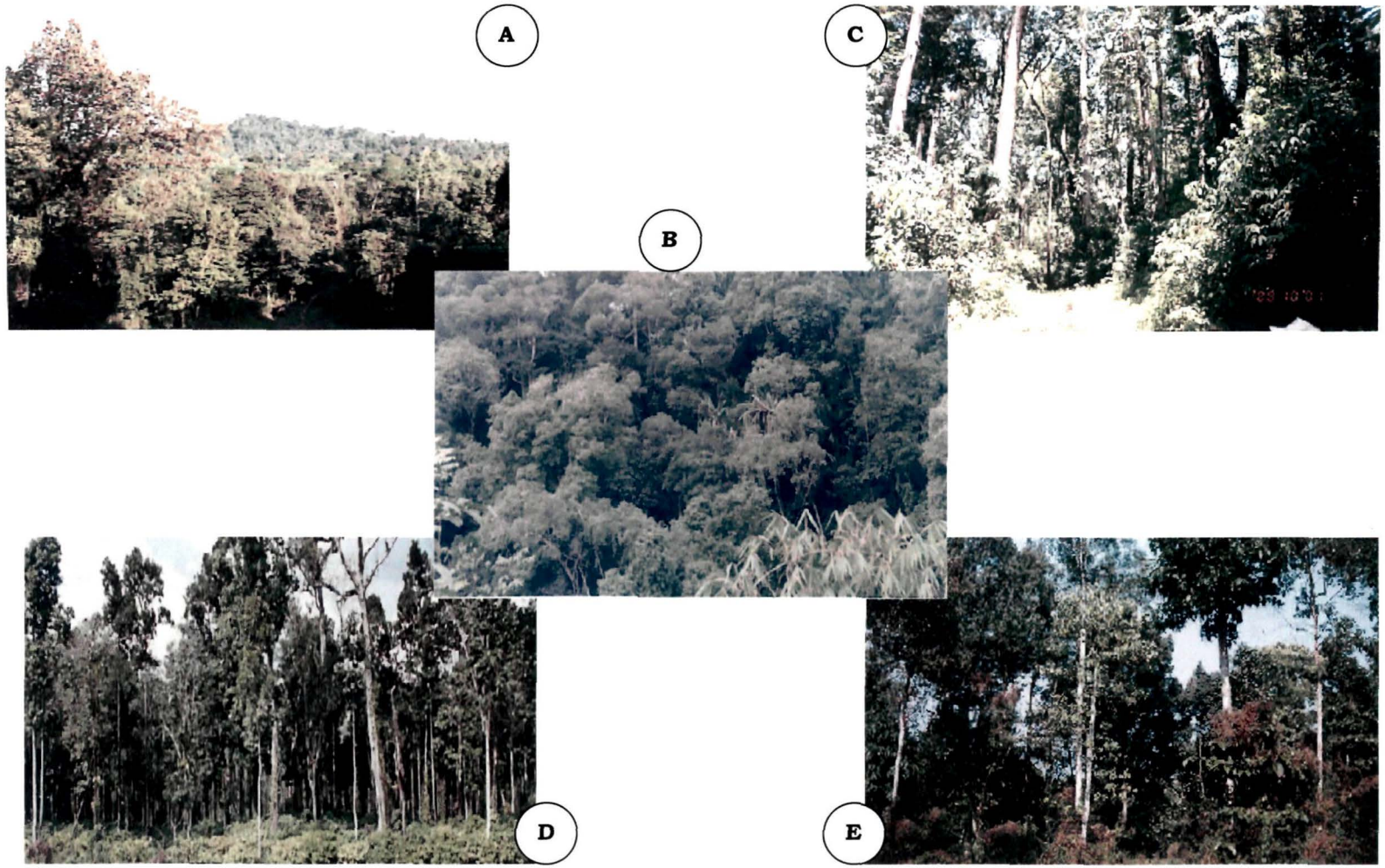


Plate II.1. View of the forest stands exposed to various degrees of disturbances. (A) – An overview of a part of the undisturbed stand, (B) – Close up of a small patch of the same forest, (C) – Mildly disturbed stand, (D) – Moderately disturbed stand, (E) – Highly disturbed stand.

Pot experiments:

The pot experiments were conducted on the campus of North Eastern Regional Institute of Science & Technology, Nirjuli (27° 07' N latitude, 93° 22' E longitude, 100 m altitude) under the greenhouse conditions (over the season: R.H.=60-85%; air temperature, 28-36 ^{0}C max., 15-22 ^{0}C min.; light intensity 290-30000 lux.).

Climate:

The study area falls within the tropical climate and is typically monsoonal with distinct cool (December to February) and wet (May to September) seasons. The periods from October to November and from March to April represent autumn and spring seasons, respectively. Winter months are comparatively cool and dry, and the temperature may drop to 6°C. The average rainfall, temperature and relative humidity data are given in Fig. II.1. The climate is quite wet (annual rainfall, 2500-3000 mm). During pre-monsoon period from March onward occasional showers are of common occurrence. About 85% of the annual rainfall is received during the wet season. During this period humidity is very high (80-95%) and heat prevails for some time when it is not raining. Most of the annual precipitation is received during the rainy season and there is hardly a complete dry month in the year. Rains are received by the southwest as well as northeast monsoon. But maximum rainfall is received from southwest monsoon, which starts from April and continues up to October. During winter rainfall is received

from north -east monsoon. The hottest months are July-August (36 °C max. temperature).

Soil:

The soil can be classified into two classes: old alluvial and new alluvial. The old alluvial soil occurs along the river Dihing. The new alluvial soil which is of recent origin also occurs along the bank of Dihing river and it covers the older rock formation along the Namsang valley. The texture of the soil in different parts of the study site varies from sandy loam to clay with 1-5% of its volume occupied by stone. The pH of the soil ranges from 5.5 to 7.5 (Table II.1).

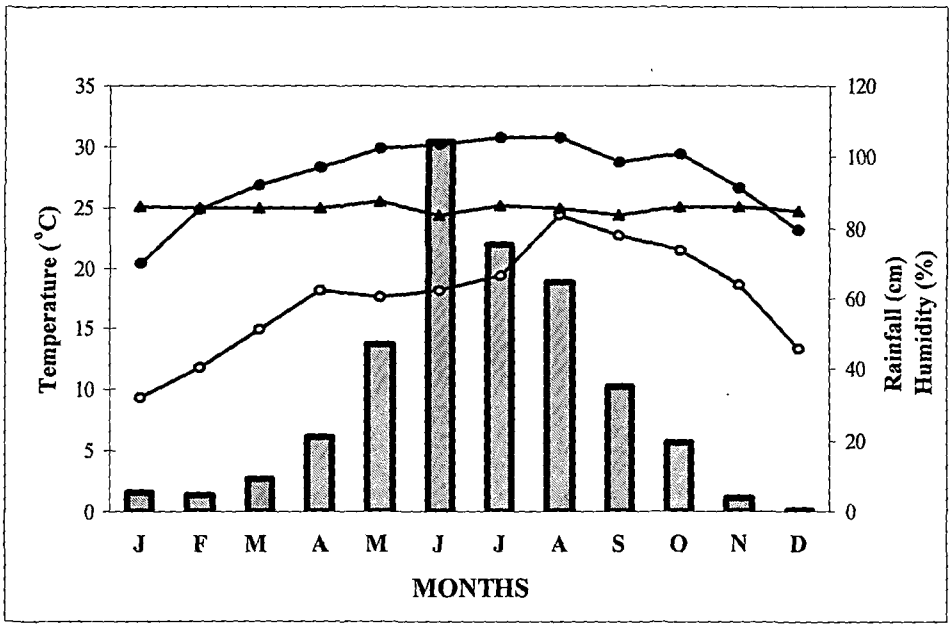


Figure II.1. Rainfall, relative humidity and temperature data for the study area during January to December (mean of years 1997, 1998, 1999 & 2000); ■, average rainfall; ▲, relative humidity; • mean maximum temperature; ○, mean minimum temperature.

Table II.1. Light intensity and soil characteristics of the study sites.

Forest stands	Light intensity (x 10 lux)	Soil texture	Soil pH	Organic matter (%)	Nitrogen (%)
Undisturbed stand	1704	Sandy loam	5.5	6.2	0.3
Mildly disturbed	1960	Sandy loam	6.2	4.7	0.2
Moderately disturbed	2307	Sandy loam	6.3	4.2	0.2
Highly disturbed	3045	Loamy sand	6.5	3.1	0.1

Vegetation:

Vegetation is dominated by *Dipterocarpus macrocarpus*, *Shorea assamica, Terminalia myriocarpa* and *Altingia excelsa*. The forests exhibit a multi-tiered stratification with a canopy layer occupied by the above species along with *Ailanthus grandis* and *Tetrameles nudiflora*. The subcanopy contains *Mesua ferrea, Elaeocarpus ganitrus, E. rugosus, E. aristatus, Bischofia javanica, Turpinia nepalensis, Terminalia citrina, Endospermum chinensis, Aesculus assamcus, Trema cannabina, Talauma hodgsonii, Sapium baccatum, Chisocheton paniculata, Vatica lancifolia, Syzygium* sp. *Mangifera sylvatica, Chionanthes macrophylla,* and *Kydia glabrescence.* The shrub layer is often

gregarious and consists of *Blastus cochinchinensis, Boehmaria glomerulata, Phlogacanthus thyrsiflorus, P. tubiflorus, Leea indica, Maesa indica, Calamus* sp., *Clerodendrum* sp. and *Laportea* sp. The herb layer has *Phrynium pubinerve, Musa* sp., *Impatiens* sp., and *Phegopteris* sp. The epiphytic flora is mainly composed of orchids such as *Dendrobium* spp., *Papilionanthe* sp., *Rhynchostylis* sp., *Agapetes* sp., *Hoya* spp., and *Dischidia* sp. A rare epiphytic pitcher plant, *Hoya rafflesiana* is also found in these forests. A detailed description of vegetation is given in ***Chapter III***.