INTRODUCTION
Cultivation of medicinal and essential oil plants has now achieved a significant role in increasing the economic level throughout the world. The demand for plant-based drugs, pharmaceuticals, essential oils and aroma chemicals is gradually rising in the world market. The trade in crude drugs, aromatic materials, essential oils and their derivatives has grown fast in the last two decades and has crossed the billion dollar mark.

According to the year book of International Trade Statistics, Vol. II. published by the United Nations, the total market in terms of exports for 1978 and 1979 for essential oils and perfumes alone was U.S.$ 1325.5 million and 1514.5 million respectively. Similarly, the total market in terms of imports for these items during 1978 and 1979 was U.S.$ 1366.9 and 1522.6 millions respectively (Sundaresh, 1982). Looking into the world export and import data for the year 1977-'78, 1978-'79 and 1979-'80, it may be noted that in respect of exports of medicinal plants, it is the developing countries which are the major cultivators and exporters with the developed countries as major importers; whereas in the case of essential oils it is the developed countries which take a lion's share of both imports and exports, except only a few essential oils which are almost the monopolies of the developing countries, being not produced by the developed countries. Some of the essential oils of this category are patchouli, citronella, lemongrass, sandalwood, geranium and clove oil. However, due to lack of sufficient
scientific inputs, the yield potentials of many aromatic crops are not yet properly known. Although, the western world has switched over to synthetic sources for preparation of perfumery and flavour chemicals, yet the natural essential oil and perfumes have their own values. It is true that synthetics have prompted some of the developing countries in East to pay less attention to research and development activities on essential oil plants. In certain cases food and other cash crops have replaced the cultivation and distillation of essential oils very significantly. However, due to recent energy crisis resulting into considerable escalation of prices of petroleum products, turpentine oil and other basic chemicals for perfumery compounds, the entire situation has changed and a time has come when more emphasis is to be laid on research and development work on certain selected aromatic plants.

Intensive survey of the available wild flora, their introduction and subsequent cultivation may still help in the discovery of new raw materials for those essential oils, which already have established uses or new essential oils of considerable values which may have potentialities both in the country and abroad.

During the routine plant resource survey of economic plants in North East region of India by the Regional Research Laboratory, Jorhat, Assam, a large number of plants were collected and introduced. Further studies in case of selected plants, are being carried out in order to find out their possibilities for
commercial cultivation. Of particular interest in this investigation, is Ocimum gratissimum Linn. (family - Labiatae) which has been selected for study as it contains eugenol of commercial utility.

The genus Ooimum, in general, is an important source of many essential oils and aroma chemicals. So far, about 160 species of Ooimum are reported (Sobti et al, 1982) but this genus is well represented particularly in the warmer hemispheres from sea level to an altitude of 600'. The maximum species are reported from tropical rain forests of Africa. The main centres of diversity in this genus are Africa, South America (Brasil) and Asia. Some of the important species available in India are Ocimum americanum L, Ocimum basilicum L, Ocimum sanctum L, Ocimum canum Sims and Ocimum gratissimum L. It is, however, observed that under North East Indian climatic conditions Ocimum gratissimum L. is found as a wild plant commonly growing in the districts of Kamrup, Nowgong and Sibsagar.

The chemical constituents largely isolated from various Ooimum species are camphor, citral, linalool, geraniol, methyl chavicol and eugenol. Eugenol is also available in some other plant species like Cinnamomum zeylanicum Breyan (Rabha et al, 1979), Cinnamomum tamala Nees & Ebers (Gulati, 1982 and Sutshi, 1982) and Eugenia carophyllata Thunb. (Guenther, 1961).

The import statistics of cinnamon oil and clove oil into India indicate that these items are being imported at a cost of Rs. 6,05,600, Rs. 3,46,000 & Rs. 6,75,000 for Cinnamon
leaf oil and Rs. 3,33,0400, Rs. 3,21,5800 and Rs. 2,49,5800 for clove oil respectively during the period 1977-78, 1978-79 and 1979-80 (Sundaresh, 1982).

Eugenol, which is primarily used as a starting material for making high quality vanillin, is available in the essential oils of Ocimum micranthum Willd., Ocimum sanctum L., Ocimum basilicum L. and Ocimum gratissimum L. (Sobti et al, 1982) in varied concentrations. Eugenol is also used in preparation of perfumes, cosmetic and flavouring of food products. In case of pharmaceutical preparations, it is used in antibacterial activity, dental antiseptic, analgesic and in external application for inflamed joints.

Considering the period of maturity for any other eugenol bearing plant species, Ocimum gratissimum L. seems to be an alternate suitable source, as its oil contents more than 75 per cent eugenol. There is also an urgent need to augment the cultivation of such valued indigenous essential oil bearing plants from the view points of resource utilization.

Since the agronomical parameters for the cultivation of Ocimum gratissimum are not readily available, in order to break the so called "yield barrier", this investigation was undertaken to study the growth, yield and oil quality of Ocimum gratissimum under agroclimatic conditions of Jorhat, Assam. The results obtained are presented in this thesis.