AIMS AND OBJECTIVES

Although India produces the highest quantity of tea in the world, little work has been carried out on effect of meteorological factors on growth and productivity of tea plants. Darjeeling Tea is famous for its world famous muscatel flavour but Darjeeling is also known as the area with lowest tea yield. As stated earlier the yield of tea Darjeeling is only 650 $kg.ha^{-1}$ which is well below the all India's average of 1730 kg. The main reasons for low yield are adverse climatic conditions as well as variety of tea. The major area under tea is planted with China variety of tea, i.e. Camellia sinensis (L.) O. Kuntze, belonging to the family Ternstroemiaceae under the order Guttiferales. This variety is a low yielder with tiny leaves.

When the climatic condition is a barrier against increase in yield potential, it was essential to study the role of weather parameters on Darjeeling tea plants. But nothing of that sort had been taken up before this study. The yield potential also depends very much on physiology of the plant. The correlation between climatic factors and their effects on physiological and biochemical processes like synthesis of proline, ascorbic acid, amino acid etc. are very much noteworthy for further study. Many authors have identified proline and ascorbic acid as an indicator of stress physiology.

It is also well known that in hilly tracts of Darjeeling soil nutrient status with respect of some macronutrients and several micronutrients played a key role in growth and productivity of tea plants. In the past, quite a few fertilizer trial experiments were done in the aforesaid perspective using zinc, phosphorus, molybdenum, potassium and sulphur. But in the present investigation, the basic approach was to understand the effect of various doses of nutrients on tea plant's growth responses.

On the whole, the overall objectives of this investigation are listed at the next page :

(i) To study the effect of seasonal variation of environmental parameters (air & soil temperatures, photosynthetic photon flux density, sunshine hour, relative humidity, wind velocity, rainfall) on the physiological attributes (net photosynthesis, stomatal conductance, stomatal resistance, leaf water potential, transpiration and leaf temperature) on three major China hybrids. These are called as Darjeeling clones viz. Bannockburn-157, Phoobshering-312 and Tukdah-78. The bushes of different stages were considered for in vivo studies.

(ii) To study the interactions between various physiological parameters under diverse weather conditions.

(iii) To understand the water relations of tea plants and behaviour of three major Darjeeling clones in water stressed situation.

(iv) To study the effect of foliar spray of micro(zinc and molybdenum) and macro (potassium, phosphorus and sulphur) on net photosynthesis, stomatal conductance and transpiration.

(v) To study the seasonal variations of total free amino acid, total proline, ascorbic acid, total chlorophyll and epicuticular wax in the leaves of three varieties viz. Bannockburn-157, Phoobshering-312 and Tukdah-78 tea clones at different growth phases/ages.

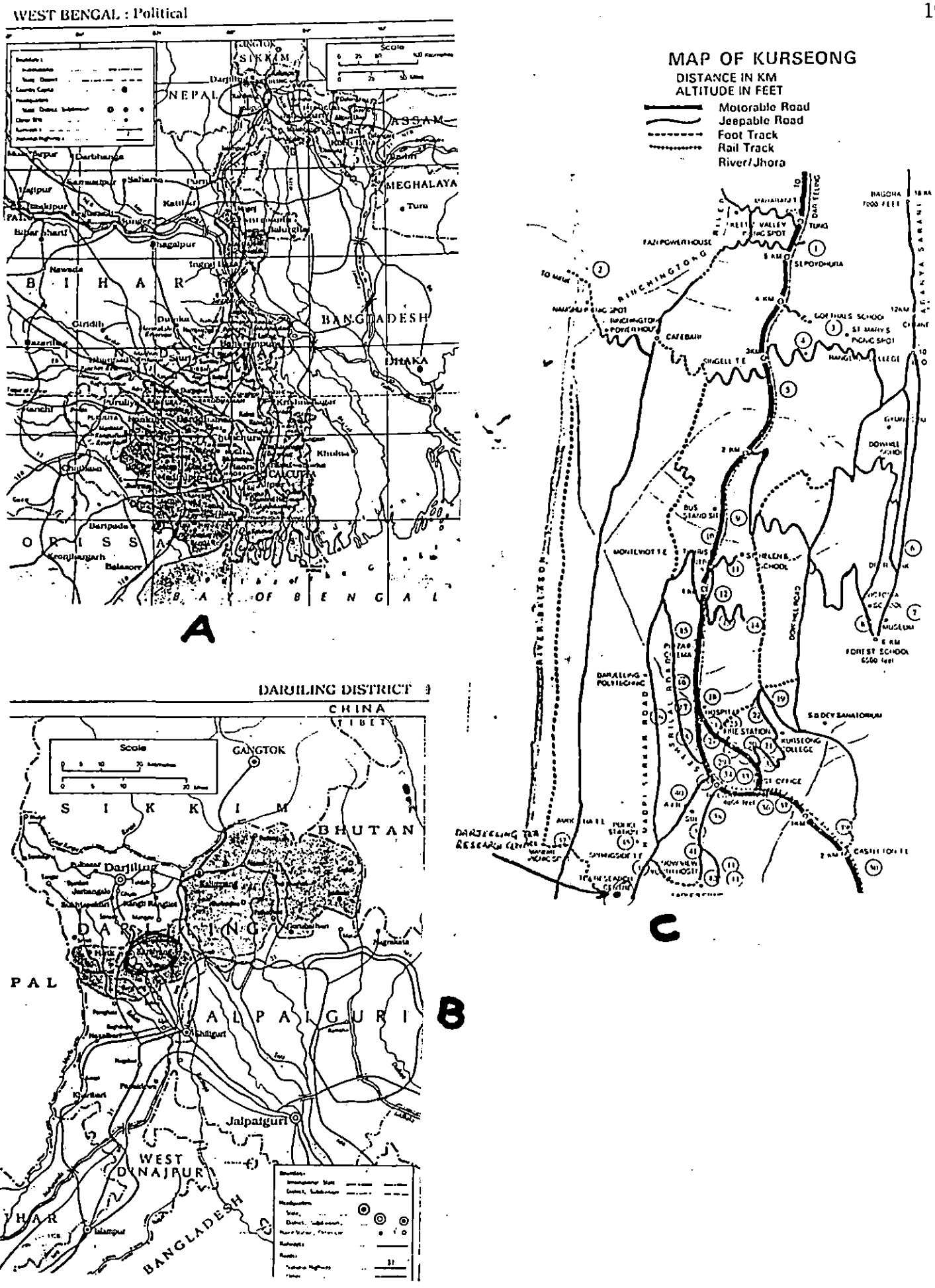

Fig. 1 : Map of West Bengal (A), Darjeeling district (B) and Kurseong town (C) showing the location of Experimental sites