PREFACE

Sikkim is a beautiful but still undeveloped tiny Himalayan state of North Eastern India. Its hilly and thickly forested land area has very little potential for large-scale agriculture of which the annual production is far- far short of the actual need. The agricultural area can not be enhanced if the forests are to be conserved. Also, because of state's topography, terrain and geology, its potential for large-scale industrialization is next to nil. Some sustenance to the people is available in form of handicrafts and other village based small scale industries like carpet-weaving, cattle rearing, honey production, vegetable growing and the like. Tourism is developing apace but its benefits are yet to reach the masses.

In such a scenario, a rich endowment of nature to Sikkim is large cardamom, in the production of which, the state's share is 53% of the world total. Cardamom plant is perennial, so the soil on the slope where it is grown, is not disturbed year after year as is the case with other crops. So, large cardamom cultivation is very eco-friendly. Moreover, it is a shade loving plant and, therefore, trees of suitable species are also to be planted in between the cardamom crop. Native genius of Sikkimese people have found such a tree in *A. nepalensis* (Himalayan Alder, or, in local parlance, "Utis").

This quick growing multipurpose tree not only provides shade to the large cardamom crop but also cheap timber, firewood and fencing material to the village folk. It is extremely useful in preventing soil-erosion. Its litterfall replenishes lost nutrients to the soil. Thus, *Alnus*- cardamom agroforestry is an irreplaceable means of sustenance for Sikkim villages.

Unfortunately, the tree is depredated by a number of insect herbivores, the chief among them being a lepidopteran *Gazalina chrysolopha* and a coleopteran *Chrysomela chlorina*. The latter attacks both; the shade tree as well as the cardamom crop, alternately. In some years, the defoliation of the tree is so severe that it results in considerable loss of shade and consequently, of the large cardamom yield. Although the two pests have been, in the past, studied as part of the other studies, no comprehensive investigation of their occurrence, behaviour or life- cycle, has been carried out. The present study is the first small step in that direction so that a preventive- cum- control measures against these major folivorous insects species (*G. chrysolopha* and *C. chlorina*), could be taken, using information generated on their bio-ecology in the present research work.

Besides this, the population dynamics and biology of the pests are investigated in detail to understand their influence on *A. nepalensis* and its associated soil system, which may be of help in the management of the *Alnus*-cardamom agro- forestry system.