

## 2: OBJECTIVES AND NATURE OF WORK

Notwithstanding the general account of the fern flora of eastern Himalaya (Bir 1987), very little work has been done with a special eye to the diversity and distribution of fern species from Darjeeling plain. Moreover, a first hand information on the fern entomofauna of Terai is largely lacking. These lacunae have prompted the present investigation, the results of which would hopefully furnish a ready account of the fern flora and its insect associates from this region.

The faunistic study of the fern associated insects from a phytogeographically important region like the eastern Himalayan foothill is of general interest to the entomologists and agroeconomists working in a similar foothill region or in related fields. Therefore, surveys were conducted with an eye to find out whether the ferns have the potentiality to support adequately the insect herbivores. The other purpose was to find out the number of fern feeding insects which were also known to attack plants of agricultural importance. Further, the study of fern entomofauna is also expected to bring to our knowledge, for the first time, a list of beneficial and harmful insects

that ferns harbour from this region and therefore, contributing in one way or other to the adjoining ecosystem. Besides the floristic study of ferns and associated entomofauna, the bioecological studies of Spilarctia obliqua (Walker) and Spilarctia casigneta (Kollar) and an orthopteran species (Atractomorpha crenulata Fabricius ) have been envisaged, because these species are reported polyphagous showing their natural occurrence at least from this region, on ferns and some of the locally cultivated crops.

The larvae of Spilarctia (=Diacrisia) obliqua is a well-known pest of angiosperms including jute. (Fig. 5a). These larvae are also found to feed on the fern species, Diplazium esculentum (Retg.). So, to understand the nutritional ecology and fitness of the pest on two distant host, a detailed study was initiated on its host-plant preference, life cycle, survival and other performance in laboratory. The capacity of food utilization and allocation in terms of dry weight have been conducted using jute (Corchorus capsularis L.) as the economic host and fern (Diplazium esculentum) as the non-economic host. For a better understanding of the effects of the food chemistry, some dietary components and secondary substances of both the hosts have been

analysed. Spilarctia casigneta is another arctiid moth, the larvae of which are serious depredators of a number of crop plants (Banerjee and Haque, 1985; Chatterjee and Chaudhury, 1989). In Darjeeling plain the larvae of this moth have been found to be well associated with the fern species D. esculentum. In the northern part of West Bengal, including the Terai, mulberry sericulture is regularly practised, (Fig. 5b) extended and encouraged at the rural level. There are reports of occurrence of Spilarctia obliqua on mulberry (FAO manual, 1987) . As both these arctiid moths are considered under the same genus Spilarctia (Z.S.I. Report No. 6/90) and are difficult to distinguish by looking at the adult morphology, an investigation was contemplated using mulberry as an alternate angiosperm host for S. casigneta. The bioecological studies for S. casigneta has been done following the same plan as envisaged for S. obliqua.

One of the most commonly occurring polyphagous orthopteran pest, Atractomorpha crenulata , chiefly uses the fern host Christella crinipes (H.) and is also known to attack the sympatric fern species D. esculentum besides other angiosperm hosts (Senthamizhselvan and Murugan, 1988; Ram and Gupta, 1989). The jute C. capsularis is used as a natural angiosperm

host by the acridid species in this region. So, the present bioecological study has been done using the fern C. crinipes and jute, C. capsularis as hosts. Following the earlier pattern, the aspects of investigations include hostplant preference, feeding habit, life cycle, survival, other performance and finally the nutritional budget of the nymphs. An analysis of dietary components, including some non-nutrients and allelochemicals have been done for both the hosts in order to have a better idea of the pests performance in light of the hosts'dietary profile.