INTRODUCTION

Soybean, Glycine max (L.) Merrill has become one of the most important grain legume crops in Asia (Shanmugasundaram 1987). In Thailand, the demand for soybean for domestic consumption is considerably high (Potan 1987) that it has become a very important economic crop for the northern region. In the Chiangmai valley, soybean after rice is predominant for approximately more than 80% of the farmers. Current yields are however, considerably low, average 1.5 tons per hectare (Potan 1987).

Damage due to pests still remain one of the most serious production constraints in soybean in Northern Thailand (Hengsawad and Tanomthin 1983). Several reports have indicated that many insect pests are found associated with soybean in Thailand (Castelo and Pholboon 1967, Visitpanich 1985, Visitpanich et al. 1985). Of the 29 species identified, the soybean stem fly, Melanagromyza sojae (Zehntner) is found to be among the most serious threat to soybean in the Chiangmai valley (Visitpanich et al. 1985). While several attempts to control the soybean stem fly have been done in Thailand

and elsewhere, these are met with varying degrees of success. In Taiwan, breeding is underway to incorporate the resistance of four wild soybean accessions (Glycine soja Sieb and Zucc.) into agronomically acceptable cultivars (Talekar and Chen 1986). In Thailand, cultivars resistant to this fly are not available at present and so their control is still solely dependent upon chemicals (Potan 1987). Visitpanich (1985) reported that in Northern Thailand M. sojae is routinely controlled with insecticides. Although insecticides directed against the soybean stem fly are effective, they do not fit well into pest management programs. Hengsawad and Hengsawad (1983) indicated that the application of chemicals often do not provide economic control since farmer's lack of knowledge regarding proper pesticide usage can either result in generating adverse effects to the environment or increasing costs of production. In the United States, Kogan (1976) reported that some insecticides used on soybean destroy most beneficial insects together with the pests and frequently caused resurgence of the pest a short time after treatment. Its effectiveness against a pest population also diminishes with time as the targets develop resistance to the pesticide. This eventually encourages population outbreaks as documented by Flint

and van den Bosch (1980). Considering the enormity of losses in yields due to M. sojae and the harmful consequences of chemical control to the fauna and the environment, the need for an alternative strategy to soybean pest control is therefore critical if soybean production is to be increased while keeping the production costs of this cropping system at a minimum and yet sustainable in the long run.

A wide range of evidence exists that pest problems are aggravated by the reduction in environmental diversity associated with intensive cultivation of crops. Therefore, breaking the monoculture usually results in the stabilization of the insect communities of ecosystems (Root 1973). Southwood and Way (1970) indicated that the diversity of a crop system can be affected by a variety of factors such as interplanting different crop species, maintaining patches of wild vegetation and management of species composition surrounding the crop field.

Weeds have traditionally been considered unwanted plants that reduce yields by competing with crops or by harboring insect pests and diseases (van Endem 1965). The presence of certain weeds within a crop field, however, can greatly influence the fauna, some of which are destructive to the crop (Altieri 1988). There are several

reports of decreased pest damage in weedy crops compared to that of weed free crops (Root 1973, Cromartie 1981, Altieri 1983, Altieri 1984, Altieri 1987, Altieri 1988). The abundance of pests are reduced because of the increase in populations of natural enemies, chemical repellancy and masking, changes in the colonization background of the pest, and/or simply because the crop is less apparent to the pest (Way and Cammell 1981).

Very little has been reported relating the significant effects of weeds and other types of vegetation within on the fauna of a soybean cropping system in Thailand. The purpose of this study was to establish principles of soybean pest management under different ecological conditions and do not develop methods to enhance crop production. Crop yields were measured however, in order to have a basis on which to evaluate the agronomic potential of the proposed systems. Based on the ecological principle, the study was designed to determine (1) if the vegetation textures associated with soybean have certain influences on the population dynamics of the soybean stem fly, M. sojae in Chiangmai valley, (2) their feeding impact on soybean (Glycine max), when soybeans were grown with sweet corn or other non-hosts (i.e weeds), or both and (3) the

damage to soybean caused by the soybean stem fly, M. sojae in various soybean cropping systems.