1. INTRODUCTION

A higher species diversity is associated with the more complex and heterogeneous physical environment which is prevalent in traditional systems of production. However, with the use of new technology and modern cultivation there has been reduction in species diversity. A wide range of evidence exists that pest problems are aggravated by reduction in environmental diversity associated with intensive cultivation of crops (Cromartie 1991). Therefore, breaking the monoculture usually results in the stabilization of the insect community in the ecosystem (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. According to Vandermeer (1989) intercrops frequently demonstrate a lower level of pest attack than monocultures. Matteson et al. (1984) indicated that a reduced insect pest incidence in multicrops may be the result of increased parasitoid and predator populations, availability of alternative prey for natural enemies, decreased colonization and reproduction in pests. Other mechanisms such as chemical repellency, masking feeding, physical barriers have been criticized for their effect on herbivorous insects. Cromartie (1991) indicated that diversification of the crop can also inhibit visual orientation by pests. He added that the difficulty of insects in finding a host is likely to be greater in situations where the food plant is dispersed among other vegetation. He also stated that the complexity of an interplanted crop may impose physical obstacles to colonization of pests such as aphids, flea beetles, and possibly some Lepidoptera and Hemiptera. Cromartie 1991 reported that the difficulty of discovery results from the plants being dispersed in a community of high spatial, biotic, and microclimatic complexity. In particular, the odors which such insects use in locating their hosts will be mixed with odors of other plants, leading to confusion, antagonism, and repellency and a breakdown of patterns of orientation to the host. The presence of a taller or denser intercrop may simply hide plants from a pest. Examples of some interactions have been reported by Harwood (1993) that the population of corn borer, Ostrinia furnacalis Guenee was reduced when corn intercroped with peanut via the abundance of natural enemies which have been provided a better habitat by the peanuts. In East Java, a common practice of farmers by broadcasting of soybean seeds a few days before rice will be harvested can reduce the incidence of bean fly infestation. Tahvanainen and Root (1972) reported that collards grown with tomato or tobacco interplanted had fewer individuals of flea beetle Phyllotreta cruciferae (Goeze). Cromartie (1991) found that the leafhopper Empoasca kraemeri Ross and Moore was repelled by odor of weedy grasses in bean cropping systems. He also reported that tall maize plants among beans and squash interfere with flight behavior of certain herbivorous beetles.

In Thailand, a large number of insect pest has been recorded as associating with mungbean in the field, agromyzid fly, Ophiomyia phaseoli Tyron; pod borer, Maruca sp.; green stink bug, Nezara viridula

Linneaus; aphid, Aphis craccivora Kock are responsible for significant losses in yield of mungbean (Sepwasdi et al. 1989; Chainutvati et al. 1987). These insect pests have been controlled with various insecticides (Potan 1987). Cayme (1990) indicated that the application of chemical often does not provide economic control due to farmer´s lack of knowledge regarding to proper pesticide usage. Sole dependence on insecticides may lead to resistance to insecticides, loss of natural control agents and resurgence of pest populations (Sehgal and Ujagir 1987). The difficulties related to the use of chemicals, suggested that current spray practices may not fit well with the current pest management concepts as stated by Matteson et al. (1984). Thus, a search for alternative control practice which reduce the use of pesticides is required for integrated pest management program of mungbean cropping system.

Very little has been reported relating to the significant effects of mixed vegetation as compared to monoculture on the population densities of herbivores and their natural enemies associated with mungbean in pure in mixed stands. Based on the ecological principle, the major objectives of this work were to study (1) the insect species diversity in mungbean monoculture and mixed planting systems for specific interactions that play a role in mechanisms underlying the resource concentration and the natural enemy hypotheses, (2) the natural enemy foraging efficiencies which are effected by the plant community members, and (3) the effect of designed cropping systems on the nature and causes of the responses of the herbivorous insects, predators and parasitoids. These findings may contribute to improved management of insect pests in tropical mungbean agroecosystems.