

## CHAPTER 1

### INTRODUCTION



Mangrove forests are important and characteristic coastal ecosystems in the tropical and subtropical region. They occur in estuaries, river mouths, bays of islands and sheltered coasts. Mangrove forests consist of true mangrove plants and associated species belonging to unrelated families but possessing similar physiological characteristics and structural adaptations with common preferences to the intertidal habitat (Haig et al., 1958). Mangrove forests on the coasts of the Southeast Asian countries reach their optimum development (Macnae, 1968). In Thailand, the mangrove areas were estimated by using satellites imagery (ERTS-1), in 1972, to be about 312,720 hectares (3,127 km<sup>2</sup>), approximately 60 % of which were found very extensive on the west coast from Ranong down to the Malaysian border (Vibulsreth et al., 1976).

About 167,180 ha or 53 % of the mangrove forests in Thailand have been exploited for timber (Sukwong et al., 1976). These areas are under the intensive management plan of the Royal Forest Department. The method of exploiting is a clear felling strip system on a 30 year rotation. Silvicultural rotation is employed, so that the timber resources would be maintained for the sustained yield. The timbers are used for building, firewood and charcoal. The production of charcoal in Thailand is between 150,000-200,000 metric tons per year (Aksornkoae, 1979).

Mangrove areas are known to be important feeding and nursery grounds for many marine commercial organisms (Heald and Odum, 1970). Fish, shrimps, crabs and molluscs are caught in these areas as food. Larvae of these animals, such as penaeid shrimps, come to the mangrove areas to nurse and grow. Mangrove areas including mud flats are suitable for aquaculture. Ponds created by clearing mangrove are used for shrimp and fish culture. The seawater containing shrimp seeds is drawn into the ponds. Sea bass fry (*Lates calcalifer*) is collected from the natural water and reared in the ponds. The mussel, *Mytilus viridis* (=smaragdinus), grow on the upright bamboo stakes anchored in the sea bottom in front of mangrove forests. The clam, *Anadara granosa*, grows in the muddy beds, while the oysters, *Crassostrea* spp., grow on the cement rocks placed on the mud flat in front of the forests. The status and practices of coastal aquaculture in Thailand were reported by Chondej and Poochareon (1979). Macnae (1974) points out the importance of mangrove forests related to the fisheries. He also states "No mangrove : no prawns".

Many ecological studies concerning the mangrove have been made, but mostly deal with the flora and forestry aspects. Comprehensive information on mangrove fauna and flora in the Indowest Pacific region is given by Macnae (1968). Chapman (1976) provides a very comprehensive account on mangrove vegetation of the world. He divided the mangrove of the world into two major groups, i.e. the old World and the New World. The Old World mangroves extend from the East Africa, up to the Red Sea, around India, Southeast Asia, the Philippines, up to Southern Japan, to

Australia, New Zealand and the Oceania. The New World mangroves occupy West Africa, the Americas, and some areas on the west coast of Central and South America.

In Thailand, a comprehensive report on forestry aspect was made by Sukwong et al. (1976). Smitinand and Phengkhilai (1971) have indicated that there is not much different in the species composition of mangrove forests between the southeastern region and the west coast of the peninsula, but the east coast mangrove is quite different. Structure of mangrove forests was studied by Aksornkoe (1975, 1976) in Amphoe Khlung, Chantaburi; and Chansang (1980) in Ko Yao Yai, Phang-nga. Mangrove production and some plant ecological data have been provided by many authors (e.g. Aksornkoe, 1975; Christensen and Wiium-Andersen, 1977; Christensen, 1978). Christensen (1977) points out that primary production of mangrove forests is seven times higher than that of the coastal waters and leaf production alone of about two times higher than the phytoplankton production of the coastal waters. This indicates the importance of mangrove forests as a source of detritus for the coastal environment.

Descriptive accounts of mangrove macrofauna have been given by several authors (e.g. Macnae and Kalk, 1958; Macnae, 1963, 1968; Berry, 1963, 1972). Macnae and Kalk (1958) discuss five factors which probably control the animal distribution in mangrove, i.e. the tidal inundation level; tolerance of animals to dessication; the demand for protection from sunlight; the substrate type and the food availability in the upper layer of the substrate. Berry (1963) recognised the mangrove habitat as a three dimensional community with two main patterns of fauna zonation, a horizon-

tal zone from the sea towards land and a vertical zone from the ground to the tree tops.

Some general aspects of mangrove macrofauna have been studied in Thailand (Isarankura, 1976a; 1976b; Nielsen, 1976). The population density of mangrove fauna in various mangrove habitats have been studied by Hutchings and Recher (1974) in Australia; Sasekumar (1974) in Malaysia; Frith et al. (1976), Frith (1977), and Nateewathana and Tantichodok (1980) in Thailand. Some density studies deal with certain groups of animals, e.g. Brown (1971) with gastropods; Warner (1969), Macintosh (1980) and Pinto (1980) with crabs. The population biomass of mangrove fauna, however, has received little attention.

The objective of this study is to provide more background information in Thailand on the species composition, density and biomass of macrofauna inhabiting the mangrove forest and adjacent mud flat.