



ISSN 0125-796X

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**QUANTITATIVE ESTIMATION OF THE DISTRIBUTION AND
BIOMASS OF SEAGRASSES AT HAAD CHAO MAI
NATIONAL PARK, TRANG PROVINCE, THAILAND**

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KASETSART UNIVERSITY FISHERY RESEARCH BULLETIN

NUMBER 22: FEBRUARY, 2000

เอกสารวิชาการประมง มหาวิทยาลัยเกษตรศาสตร์

ฉบับที่ 22: กุมภาพันธ์ 2543

SPECIES COMPOSITION OF SEAGRASSES AT HAAD CHAO MAI NATIONAL PARK, TRANG PROVINCE, THAILAND

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ABSTRACT

The species composition of seagrasses at Haad Chao Mai National Park, Trang Province, was conducted in March and December 1998 and March 1999. Nine species belonging to six genera of two families were found. Of these, eight species were from Khao Bae Na and the same number from Laem Yong Lam while there were only six species from Ko Muk. The dominant species during the month of March were *Halophila ovalis*, *Halophila decipiens* and *Enhalus acoroides*. All the three dominant species were in flowering and fruiting condition. The occurrence and abundance of other species in the order listed were *Cymodocea rotundata*, *Thalassia hemprichii*, *Halodule uninervis*, *Cymodocea serrulata*, *Syringodium isoetifolium* and *Halodule pinifolia* respectively. All these species were sterile with no evidence of flowers and fruits. *Halophila decipiens* was the only species disappeared in December. Most of the seagrasses disappeared from Kao Bae Na especially *Halophila ovalis* which had been the dominant species of this area.

INTRODUCTION

Seagrasses are very important macrophytes in coastal marine ecosystem. They occurred along the coasts of temperate and tropical seas. The 16 seagrass taxa reported from the ASEAN region make its marine submerged angiosperm flora the second most highly diverse in the world (Fortes, 1992). In Thailand 12 species of seagrasses have been reported from the coasts of the Gulf of Thailand and the Andaman Sea (Lewmanomont *et al*, 1996). Chansang and Poovachiranon (1994) reported 10 species of seagrasses from 25 study sites along the west coast of Thailand (in the Andaman Sea). Of these 7 species were collected from Haad Chao Mai and 8 species from Talibong, Muk and Sukorn Islands.

Seagrass bed in Trang Province, the largest seagrass bed in Thailand, serves as feeding ground for dugong which is an endangered marine mammal in Thai waters. However, information in this seagrass bed is still limited. The distribution and density of seagrass at Haad Chao Mai National Park especially at Khao Bae Na is changed drastically during the last decade (personal observation and B. Bendell, pers. com.). This may be due to environmental changes by the monsoon and by human activities.

MATERIALS AND METHODS

Study site

Haad Chao Mai National Park belonging to the Royal Forestry Department, is located in Trang Province, southern Thailand facing the Andaman Sea, between latitude 7° 21' - 7° 25' N and longitude 99° 18' - 99° 21' E. Khao Bae Na and Laem Yong Lam are two locations along the seacoast of Haad Chao Mai. Ko Muk is an island about 3 km far from the mainland. It situated in between Khao Bae Na and Haad Chao Mai. (Fig. 1)

Three locations, Khao Bae Na, Laem Yong Lam and Ko Muk, were the collecting sites in this study (Figs. 2-4).

Collecting methods

Seagrasses from the three mentioned sites were collected from intertidal and subtidal areas in March and December 1998 and March 1999. The specimens were cleaned and preserved one part in 4% formaldehyde-seawater and another part was mounted on papers and dried as herbarium specimens. Morphological details were examined and the species were identified.

RESULTS

Nine species of seagrasses belonging to six genera and two families were found (Figs. 5-13).

Family Cymodoceaceae

Halodule pinifolia (Miki) den Hartog

Halodule uninervis (Forsskål) Ascherson

Cymodocea rotundata Ehrenberg and Hemprich, ex Ascherson

Cymodocea serrulata (R. Brown) Ascherson and Magnus

Syringodium isoetifolium (Ascherson) Dandy

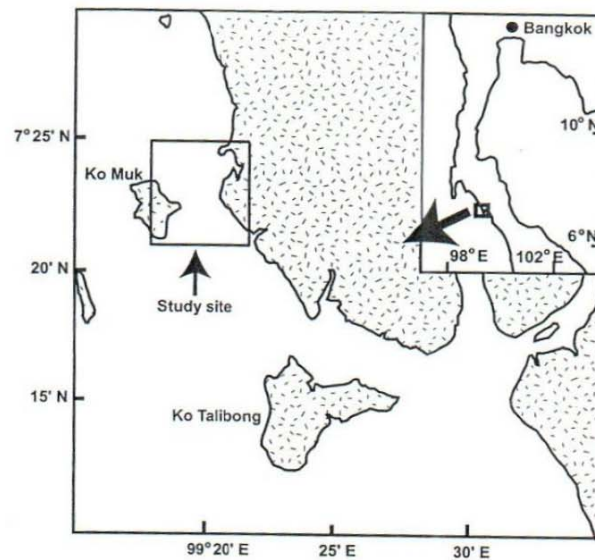
Family Hydrocharitaceae*Enhalus acoroides* (L.f.) Royle*Thalassia hemprichii* (Ehrenberg) Ascherson*Halophila ovalis* (R. Brown) Hooker f.*Halophila decipiens* Ostenfeld

Fig. 1. Map of the study site at Haad Chao Mai National Park, Trang Province

Of these, eight species were from Khao Bae Na and the same number from Laem Yong Lam while there were only six species from Ko Muk (Table 1).

Table 1. Occurrence of seagrass species at three locations of Haad Chao Mai

Species	Kao Bae Na	Laem Yong Lam	Ko Muk
Family : Cymodoceaceae			
<i>Halodule pinifolia</i>	•	•	•
<i>Halodule uninervis</i>	•	•	•
<i>Cymodocea rotundata</i>	•	•	•
<i>Cymodocea serrulata</i>	•	•	
<i>Syringodium isoetifolium</i>		•	
Family : Hydrocharitaceae			
<i>Thalassia hemprichii</i>	•	•	•
<i>Enhalus acoroides</i>	•	•	•
<i>Halophila ovalis</i>	•	•	•
<i>Halophila decipiens</i>	•		

The dominant species during the month of March were *Halophila ovalis*, *H. decipiens* and *Enhalus acoroides*. All these three dominant species were in flowering and fruiting condition. The occurrence and abundance of other species in the order listed were *Cymodocea rotundata*, *Thalassia hemprichii*, *Halodule uninervis*, *Cymodocea serrulata*, *Syringodium isoetifolium* and *Halodule pinifolia* respectively. All these species were sterile with no evidence of flowers and fruits.

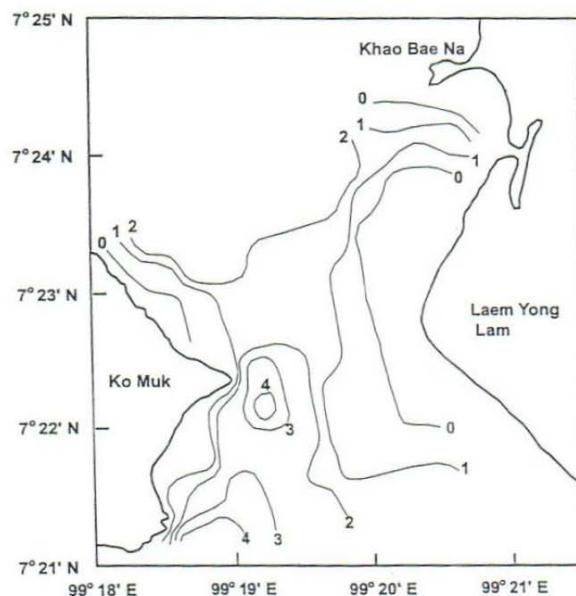


Fig. 2. Map of Haad Chao Mai with three collecting areas, Khao Bae Na, Laem Yong Lam and Ko Muk

During the month of December, most of the seagrasses disappeared from Khao Bae Na especially *Halophila decipiens* and *Halophila ovalis* which have been the dominant species in this area. Only small patches of very small leaves and thin stolons which looked very much like *Halophila minor* could be observed on the exposed mud flat during low tide. *Cymodocea rotundata* with reddish-brown leaves occurred in large patches and few *Enhalus acoroides* in the area toward the sea.

DISCUSSION

Among the nine species of seagrasses found in the area of Haad Chao Mai in March and December, *Halophila decipiens* was the only species disappeared in December. This may be due to its being an annual species. In March of both year, 1998 and 1999, *H. decipiens* showed the abundance of flowers and fruits (Figs. 14-15). The occurrence of this species at Khao Bae Na was intertidal, exposed during low tide, down to the depth of 5 m in pure stands. This was different from the reports from other areas in Thailand. This species has been known for its deep water habitat. The species type was collected from Ko Kradat, Trat Province in the east coast of the Gulf of Thailand, at a depth of five fathoms by Schmidt in 1900 (Schmidt, 1900-1916). Den Hartog (1970) referred to Burkill's report stated that this species was found in Phuket in 1966 at a depth of 12 m. Srimanobhas (1980)

collected *H. decipiens* from Ko Kram, Chon Buri, from the depth of 10 m. Den Hartog (1970) stated that *H. decipiens* occurred from the water surface down to a depth of 85 m, usually occurred in waters between 10 to 30 m depth. He also mentioned that the complete absence of this plant from the upper water layer in the Indo-Pacific might be due to competition with the related *Halophila ovalis* which was also favored by organic enrichment of the water but generally did not descend below 10 m depth. In water deeper than 10 m *H. decipiens* usually formed pure stands. Lee Long *et al.* (1996) found *H. decipiens* at the depth of 58 m in the Great Barrier Reef region.

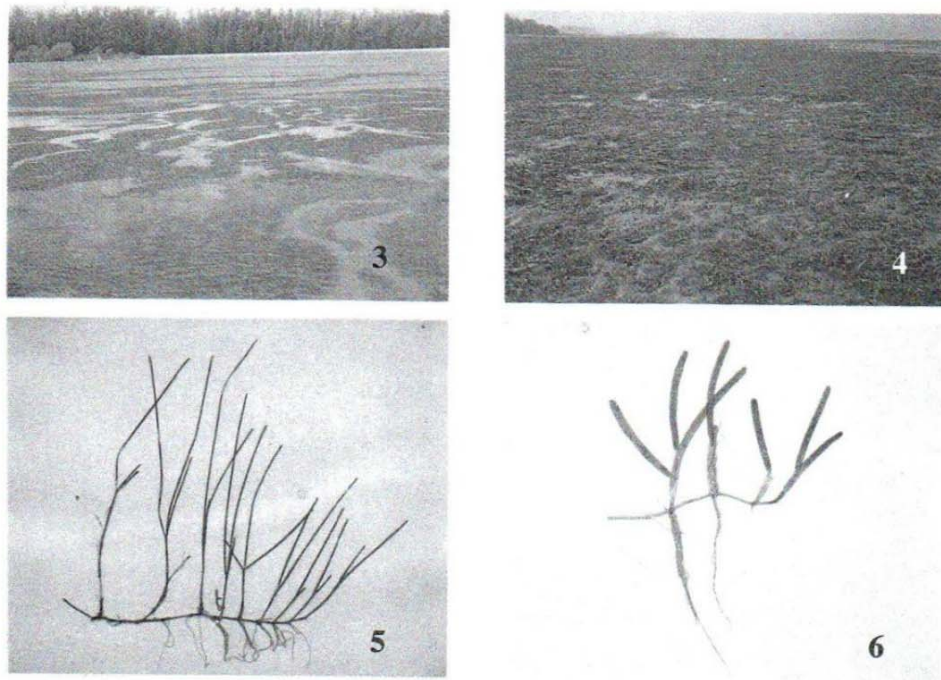


Fig. 3. Seagrass bed at Khao Bae Na during low tide with dugong feeding trails

Fig. 4. Seagrass bed at Laem Yong Lum during low tide

Fig. 5. *Halodule pinifolia*

Fig. 6. *Halodule uninervis*

Halophila ovalis found at three locations of the study site showed difference in morphology. The leaves of this species growing at the upper intertidal area at Khao Bae Na and Laem Yong Lam were rather small compared to those growing in lower intertidal and subtidal levels at Laem Yong Lam and Ko Muk. The smaller in size and in number of veins made it similar to *Halophila minor* (Fig.16). Some patches showed bigger leaves in the middle of the patch while those in the outermost parts becoming very small. Also the color of leaves of those growing in upper intertidal areas was reddish-green and always covered with silts and epiphytes while those growing in lower intertidal and subtidal levels looked clean without or less epiphytes and grass-green in color. Den Hartog (1970) stated that *H. ovalis* showed a great morphological variability. This variability was expressed in the size of the plant, the leaf-shape, the nervation, the length of the petiole, the transition of the leaf-blade into petiole,

the texture of the leaf-blade and the rhizome, the thickness of the rhizome and the number of roots per node.

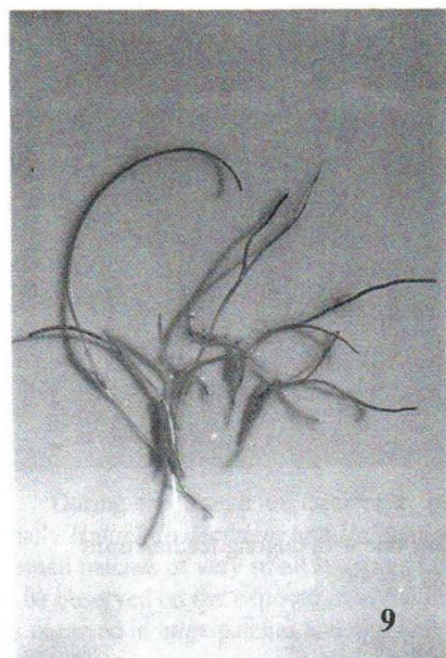
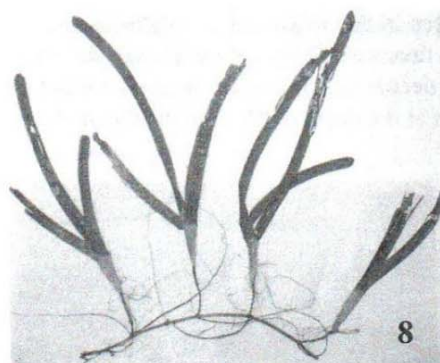
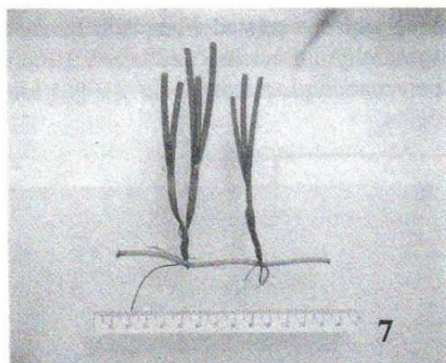


Fig. 7. *Cymodocea rotundata*

Fig. 9. *Syringodium isoetifolium*

Fig. 8. *Cymodocea serrulata*

Fig. 10. *Enhalus acoroides*

A large intertidal flat covered with *H. ovalis* at Khao Bae Na observed in March 1998 disappeared when observed again in December of the same year. Only small patches of very small leaves and thin stolons which looked very much like *Halophila minor* could be observed. This happened by the movement of sand covering the area during the monsoon season. Flowers and fruits could be collected in March 1999 (Fig.17).

Enhalus acoroides, the largest of the seagrass species found at Haad Chao Mai, was common and exhibited a wide range of distribution. It was found in shallow water from -0.5 m down to the

depth of 2 m during low tide (Nakaoka and Supanwanid, 2000). The species grew in pure stands of small and large circular patches or mixed with other species. At Laem Yong Lam, *E. acoroides* grew abundantly in intertidal area and exposed during low tide. Flowers and fruits of young and old could be collected in the months of March and December 1998 and March 1999 (Figs.18-19). This species has been reported its bearing flowers and fruits all year round (den Hartog, 1970, Lewmanomont *et al.*, 1996). The long strap-like leaves supported the growth of epiphytic microalgae, invertebrates and various microscopic organisms (Fig. 20). All these epiphytes played an important roles in seagrass communities and in marine environment.

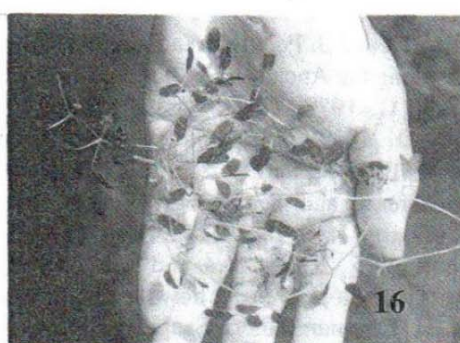
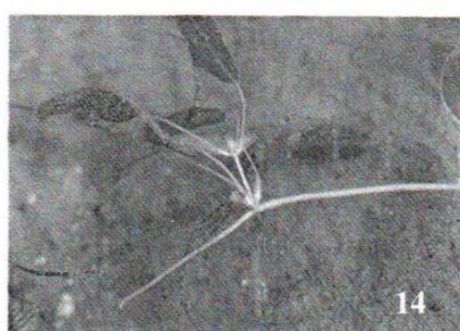
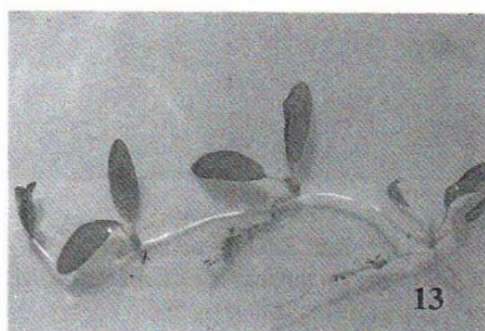
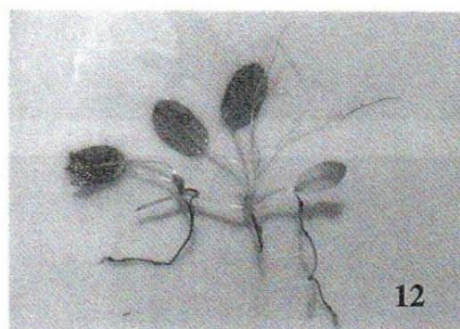


Fig.11. *Thalassia hemprichii*

Fig.13. *Halophila decipiens*

Fig.15. *Halophila decipiens* with fruits

Fig. 12. *Halophila ovalis*

Fig. 14. *Halophila decipiens* with flowers

Fig. 16. Young *Halophila ovalis*

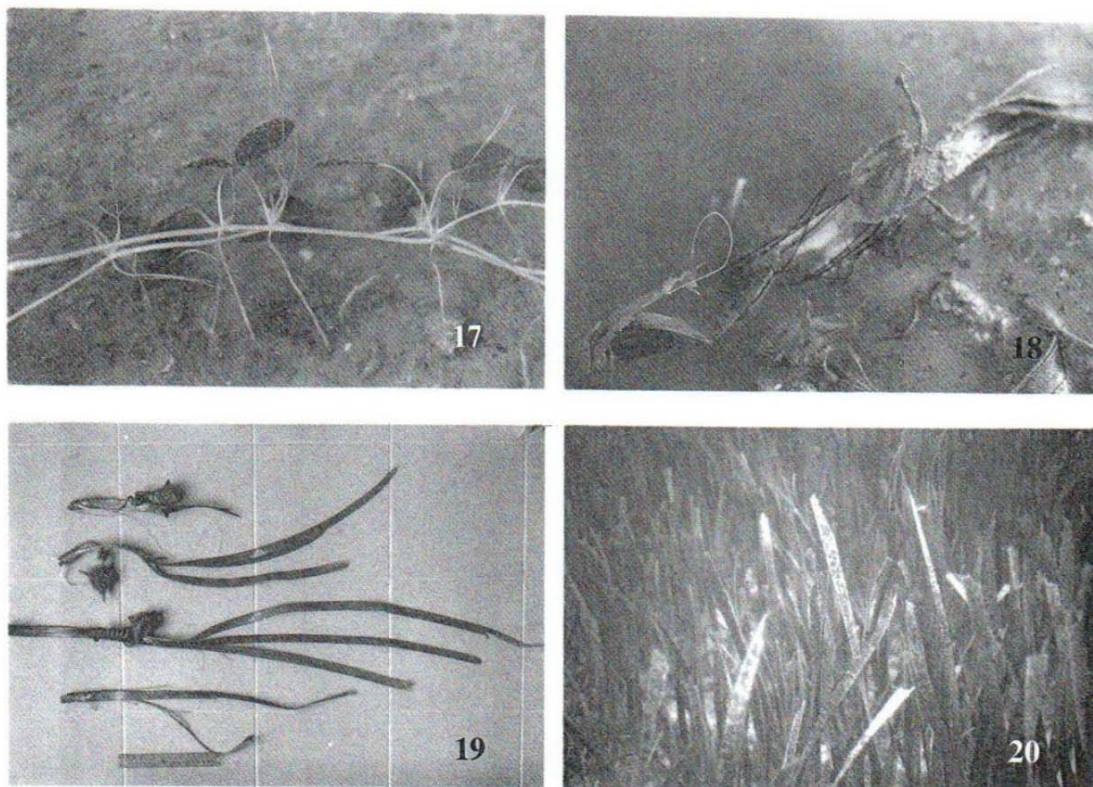


Fig.17. *Halophila ovalis* with flowers

Fig.18. Male flower of *Enhalus acotoides*

Fig.19. *Enhalus acoroides* with fruits

Fig. 20. Epiphytes on the leaves of *Enhalus acoroides*

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