

タイ国マングローブ林の植生生態学的研究

Ecological Studies on the Vegetation
of Mangrove Forests in Thailand

昭和60年 3月

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横浜国立大学環境科学研究センター植生学研究室

Department of Vegetation Science
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**Ecological Studies on the Vegetation of Mangrove
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序

従来、日本では、マングローブの様な塩性植物に興味を持つような動機は、殆ど無かったと言ってもよい。南端、沖縄県西表島などに僅かの天然林が残されている程度であることの外に、この森林が人間社会にどんな役割を果たしていたかすら全く知らなかったのが実態である。タイ一日共同研究の一環として、このマングローブを課題として取上げた経緯については、偶然の機会での Prof. Dr. Sanga Sabhasri との会話にその端を発する。その中で、欧米の科学者とのマングローブ研究に何かしら飽き足りないでいる様子を察知して直ちに協力することに賛同の意を表したことであった。過去に於いて海水科学の道を歩み、その後生物環境学を学んだ知識をこの際十分に発揮できる絶好の機会と思ったからである。また、この時の研究構想には、自然生態学を通して農林生態へ、更には沿岸地域に於ける海陸境界での生物相互間の面白い関連関係を知ることができ、引いては人間社会との関連環境まで、過去の知られざる未開の分野の解明に役立つことにもなると夢見ていたことでもある。

しかし、現実始めてみると決して生易しいものではなかった。日本の生態学者の熱心な努力もタイ国王室林野庁の技術者達の協力がなければ、到底今日の成果は期待できなかったことであろう。両国間の比較研究は、生態、生理、形態に亘り、その林産物としての利用面でもエネルギーとしてのチャコール・薪あるいは、当時世界でなお未知であった実生のアルコール醗酵を初めとして、木材およびタンニンほか化学成分の利用など広範に亘って実施されてきた。これらの成果を踏まえて、積極的に再生林及び造林への基礎ならびに応用の試験・研究に移り、派生した新しい事象の解明に進んでいる。こうした表裏一体となった共同研究については、他には余りその類例を見ない。これは偏に、参加者諸氏の自覚と熱意の貴い賜物であり、この行動こそ、真の国際協力としての模範として、お互い科学技術者の大きな誇りとしなければなるまい。

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杉 二 郎

Prefaec

In Japan, there had been very little reason to take an interest in a halophyte such as mangroves. In fact, there had been no understanding of the effects of mangrove forests on human society except for the case of a few natural mangroves growing on Iriomote Island in the southern tip of the Okinawa Prefecture. The study of mangroves was initiated as one of the joint researches between Thailand and Japan as a result of a chance conversation with Prof. Dr. Sanga Sabhasri. Feeling during the course of the conversation, that Dr. Sanga was somewhat dissatisfied with the mangrove studies carried out by Western scientists, I at once expressed my willingness to cooperate with Thai research. In the past I had been involved in seawater science and in addition, I had studied bio-environment. I thought that this would be an excellent chance to fully make use of my acquired knowledge on the subject.

I also dreamed at the time that this research would be useful to elucidate the unknown and undeveloped fields of mangrove: forestry ecology through natural ecology, interesting mutual relationships among living things on the border of sea and land along the coastal regions, the relation with human society. I believed our knowledge would thus be extended through the study.

We, however, faced many difficulties after starting the research and came to understand that the subject was not an easy one. It is certain that we could not have attained today's results without the help of the enthusiastic efforts of the Japanese ecologists and cooperation of the technicians from the Royal Forest Department of Thailand. The results of comparative studies between Thailand and Japan have influenced various fields such as ecology, physiology, morphology; the use of mangrove forest products ranging from charcoal and firewood as an energy source, to the production of alcohol, fermented from the seedlings, which is new to the world. Not only the use of wood and tannin but chemical components have been studied from many aspects. Leading on from these results, our research has progressed into the fields of basic and applied experiments and studies for reforestation and afforestation, including experiments on the inland areas in Khon Kaen, and we have hence begun to deal with new phenomena derived from the previous studies.

Our joint research, based on the close tie between the groups in our two countries, has yielded much that is unprecedented. This is the result of the self consciousness endeavor of each scientist who participated in the research and is an outstanding example of international cooperation, of which we can all be greatly proud.

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FOREWORD

Mangroves, swamps, muddy and sandy beaches are main characteristics of Thailand coastlines of the gulf of Thailand and on the west side of peninsula adjacent to the Andaman sea of the Indian ocean. For a long time, the mangrove system has been main natural resource that provides food, construction materials, fibers and medicinal plants, to dwellers in the coast areas. In the late 1960's, the complex pressure resulting from both population growth and urban expansion brought about heavy exploitation of mangrove resources. Several detrimental activities include a poorly executed logging operation, alluvial mining, road construction and conversion of mangrove forests into shrimp farms, fish ponds and salt farms. In addition, many mangrove areas near big cities have been reclaimed as real estate. It has recently been noted that many mangrove resources were manipulated beyond their environmental limits. The over-exploitation of mangrove resources without concern for their maintenance reflects the view of the local people that mangroves are an inexhaustible resource. The time has now come to realize that such attitude and behavior toward the environment needs to be changed and a sense of responsibility to protect mangroves must be restored. The public awareness of these problems began in the early 1970's. At the beginning, there were several incidents that drew attention among Thai scientists. Among them, the effects of herbicides on mangroves in South Vietnam through military uses attracted the U. S. and European scientists to pay attention to such questions, as the productivity and regeneration of mangroves. Thai scientists were invited by the U. S. Academy of Sciences to look into the problems. The mangroves area in Thailand then were used as baseline data for ecosystem study of relatively undisturbed mangroves. Plants in mangrove areas were investigated to find out their ecological role in relation to the destruction of mangroves by military use of herbicides.

Coinciding with the effects of herbicides was the conversion of mangroves to fish ponds at an alarming rate which drew attention from Thai conservationists and scientists. A group of Thai scientists who were deeply concerned with the loss of mangrove forests met in early 1970's. They then produced the message to the public that overexploitation and misuse of mangrove ecosystem could lead to detrimental effect of economically important aquatic species such as fish, prawn, shrimp, crabs and oyster along the coastlines. An appeal was issued which stated that a symbiotic relationship in which man is an equal partner with nature must be recognized. Mangrove resources must be renewed and must receive better management. A better management system must be developed, and quick action taken to bring mangroves back to the stable system. To achieve these objectives, basic information on the nature of mangroves had to be collected and understood, and this information must used as a basis for improved management and utilization. The international organizations such as UNESCO, and bilateral cooperation were searched for in order to order mobilize resources for this purpose.

In 1979 the National Research Council of Thailand and the Japanese Society for Promotion of Science mutually agreed to promote and cooperate on research projects and activities among the two organizations. The research program on the mangrove ecosystem is among

several cooperative fields in natural science area. The Thai-Japanese Joint Integrated Research Project on Mangrove Productivity and Development covers forestry, microclimate, fisheries, geology, oceanography and estuary hydrology. The joint project was scheduled for three years, from 1981 to 1983. Under the forestry research project, ecological studies carried out in the first phase include estimation of standing biomass, analysis of standing structure, regeneration and growth and phenology of mangroves species. The biological factors in mangroves such as fauna, macrofauna, mesofauna were investigated during 1981-82. The study of physical characteristics such as tide and tidal phenomena in mangroves area was part of ecosystem investigations during 1981-82. To understand the nature of plants species, systematic phytosociological studies on mangrove forest was proposed by Professor Akira Miyawaki of Yokohama National University. The research project was welcomed by Professor Jiro Sugi, the JSPS coordinator on mangrove research projects and the Thai mangrove research groups. The explanation of phytosociological system of mangrove forest and complication of vegetation maps are attempted through phytosociological fields survey.

The results of the mangrove study presented in this volume derived from the endless efforts of scientists who commit themselves to secure the natural balance. How can the increased demand of mangrove resources best be met? This book will generate the answer and the basic information for silvicultural practices and management of these mangrove species with the ultimate aim of effective utilization of biological resources of the tropical zone in harmony with the preservation of its environment.

Sanga Sabhasri
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Technology and Energy, Thai-
land)

目 次

序	杉 二郎
Foreword	Sanga Sabhasri
カラー写真および着色植生図	i ~ iv
タイ国マングローブ林の植生学的研究	宮脇 昭・奥田重後・鈴木邦雄 藤原一絵・中村幸人・村上雄秀 大野啓一・鈴木伸一・Sanga Sabhasri
タイ国マングローブ植生の群落区分と群落構造	中村武久・鈴木邦雄・檜垣宮都
1. Ranong および Pang-nga を中心として	101
Present Status of the Global Mangrove Ecosystem	Sanit Aksornkoae
	115
Features of the Soil-Water-Plant Relationship of Mangroves in Phangnga, Thailand	Hidenori Wada and Toshihide Nagano
	125
Ecological Studies of Mangrove Forests in Southern Thailand —Root Excavation by the Trench and Random Monolith Method—	Akira Komiyama, Hitoshi Moriya, Sanei Ichikawa, Kazuhiko Ogino, Sanit Aksorn- koae and Sanga Sabhasri
	137
Ecological Studies of Mangrove Forests in Southern Thailand —Leaf Dynamics of Several Key Species—	Hitoshi Moriya, Akira Komiyama, Vipak Jintana and Kazuhiko Ogino
	147

Contents

Preface	Jiro Sugi
Foreword	Sanga Sabhasri
Color Photographs and Color Vegetation Maps	i ~ iv
Phytosociological Studies of Mangrove Vegetation in Thailand	Akira Miyawaki, Shigetoshi Okuda, Kunio Suzuki, Kazue Fujiwara, Yukito Nakamura, Yuhide Murakami, Keiichi Ohno, Shinichi Suzuki and Sanga Sabhasri 1
Community Classification and Community Structure of Mangrove Vegetation in Thailand	
1. Mainly in Ranong and Pang-nga	Takehisa Nakamura, Kunio Suzuki and Miyako Higaki ... 101
Present Status of the Global Mangrove Ecosystem	Sanit Aksornkoe ... 115
Features of the Soil-Water-Plant Relationship of Mangroves in Phangnga, Thailand	Hidenori Wada and Toshihide Nagano ... 125
Ecological Studies of Mangrove Forests in Southern Thailand —Root Excavation by the Trench and Random Monolith Method—	Akira Komiyama, Hitoshi Moriya, Sanei Ichikawa, Kazuhiko Ogino, Sanit Aksorn- koe and Sanga Sabhasri 137
Ecological Studies of Mangrove Forests in Southern Thailand —Leaf Dynamics of Several Key Species—	Hitoshi Moriya, Akira Komiyama, Vipak Jintana and Kazuhiko Ogino 147



1. 河口の水際に発達している *Sonneratio albae*-*Avicennietum albae* の相観(Ranong)。
The *Sonneratio albae*-*Avicennietum albae* develops on the muddy banks of a river mouth (Ranong).



2. 典型的なマングローブ林 *Rhizophoretum mucronatae*。支柱根は4 mにも達している (Ranong)。
Typical structure of the *Rhizophoretum mucronatae*. The huge prop root of the *Rhizophora mucronata* reaches about 4 m high (Ranong).



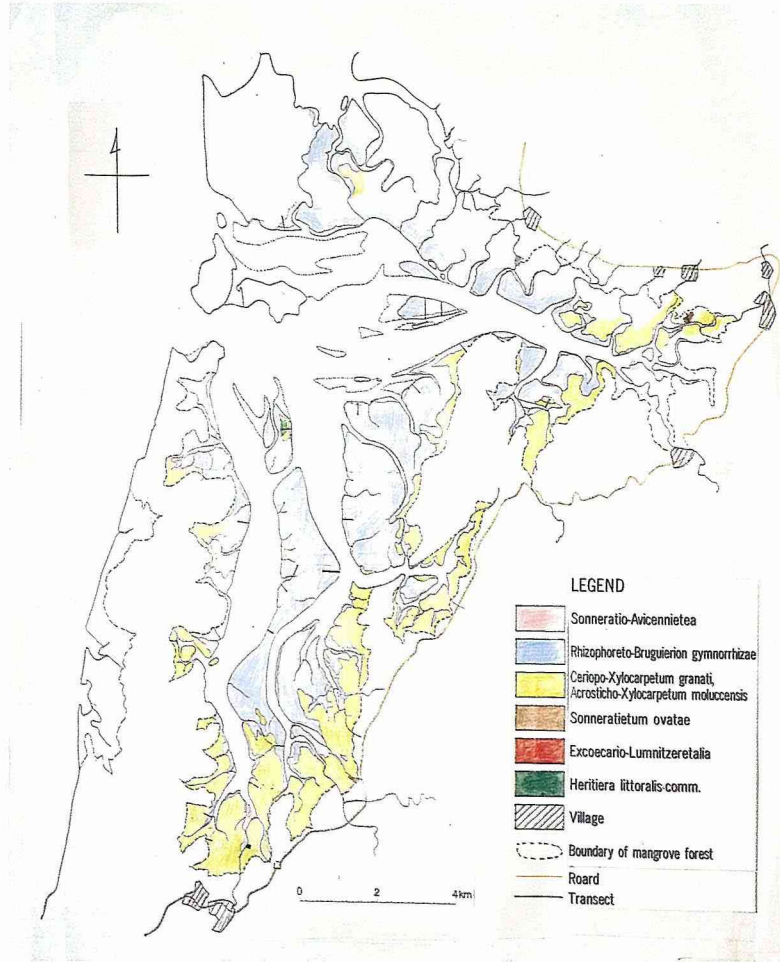
3. 林床に *Acanthus ilicifolius* の優占する *Acrosticho-Xylocarpetum moluccensis*。樹高は30mに達する (Ranong)。

Inside view of the *Acrosticho-Xylocarpetum moluccensis*. *Acanthus ilicifolius* is dominant at the floor layer (Ranong).

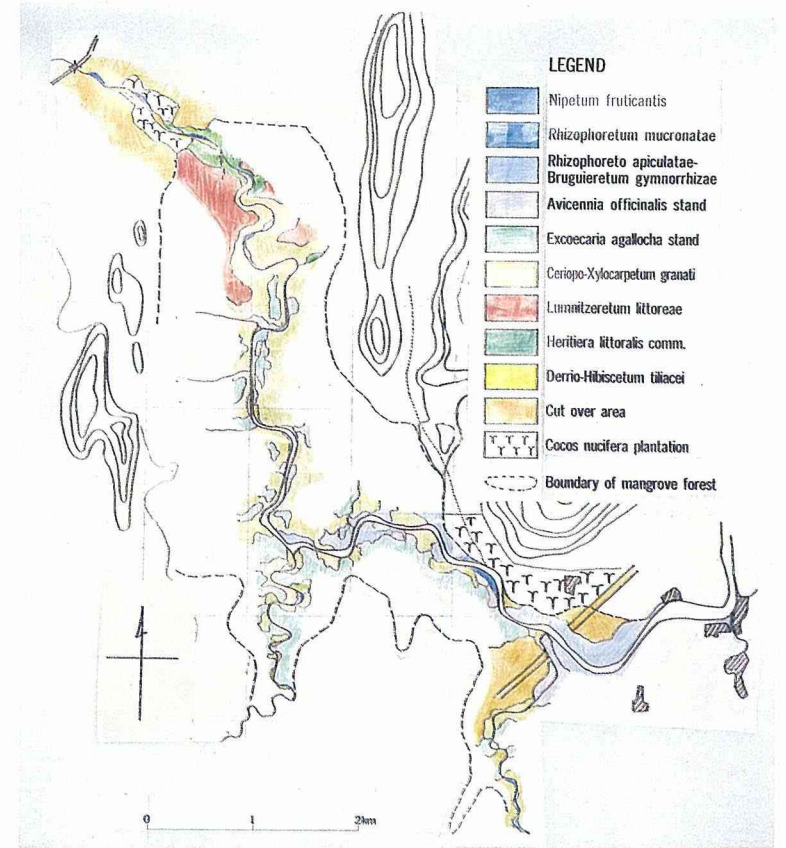


4. マングローブは主に製炭が重要な資源利用の一つである。 *Rhizophora apiculata*, *R. mucronata* が利用される (Ranong)。

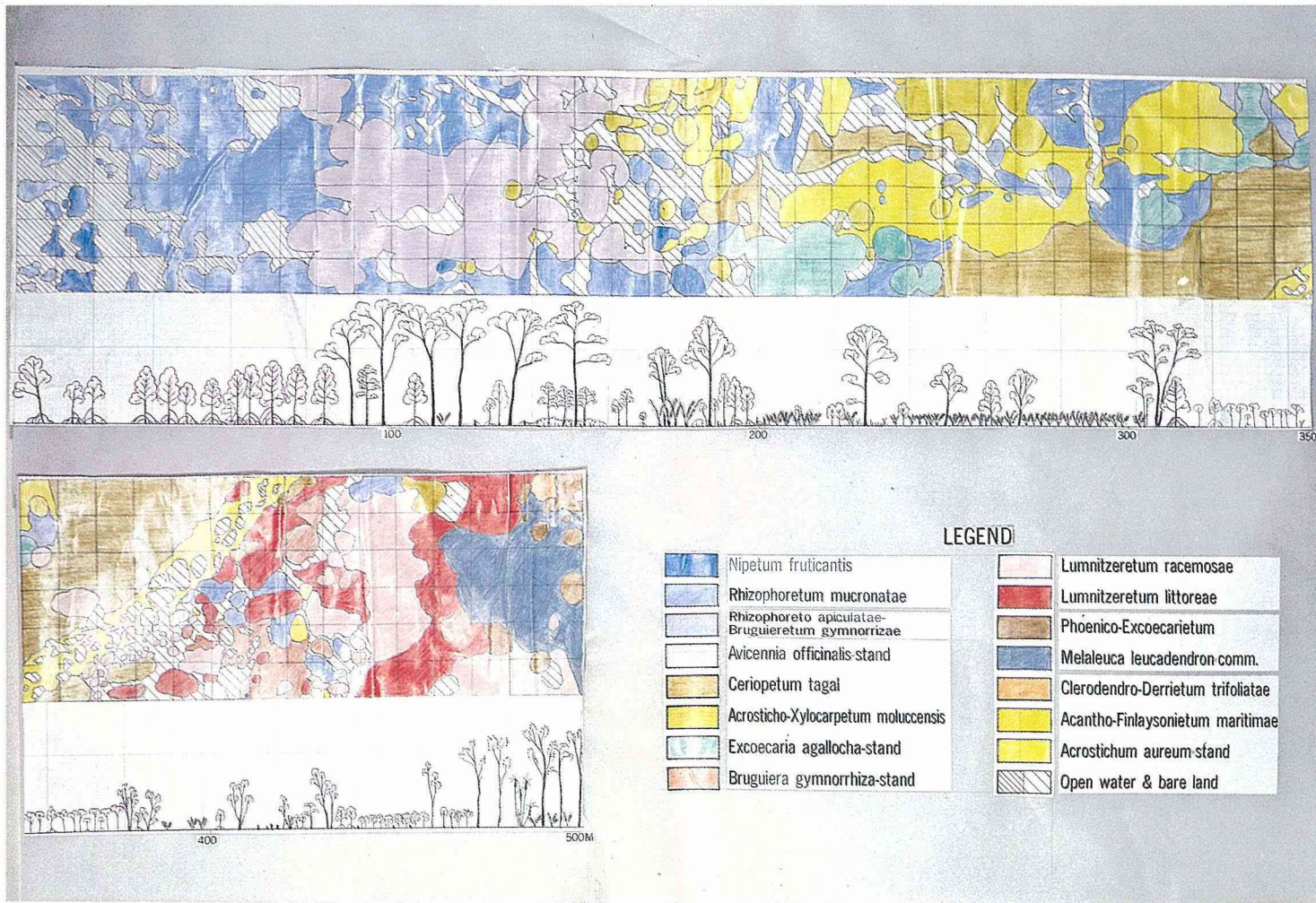
Mangrove is an important resource for charcoal products. *Rhizophora apiculata* and *Rhizophora mucronata* are the varieties mainly used (Ranong).



5 . K apur (Ranong 地区) の現存植生図 (原図は1 : 50,000).
Actual vegetation map of Kapur, Ranong area. The scale of the original map is 1 : 50,000.



6 . K hanom 地区の現存植生図 (原図は1 : 20,000).
Actual vegetation map of Khanom. The scale of the original map is 1 : 20,000.



7. Chanthaburi 地区の現存植生図 (原図は1 : 200)。

Actual vegetation map of Chanthaburi and its vegetation profile. The scale of the original map is 1 : 200.