アジア太平洋域における大学院学生の国際連携教育プログラムーダブルディグリープログラムなどの推進ー最終報告書

大学院学生短期研修派遣（平成24年）

理工学研究科 海洋環境学 博士1年　Fabienne Gabriela Kuenzli

推薦教員：立原　一憲

1.Acceptance information:

Assoc. prof. Jamie Seymour - venom specialist ,School of Marine & Tropical Biology

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2.Research term: July 6, 2012 . August 3, 2012

3.Research title, the detail and the results:

- Participation in the 12th International Coral Reef Symposium, Cairns 2012
- Comparative study of life history characteristics in Triggerfishes (*Balistidae*)

Symposium

The symposium highlighted the contemporary progress and development in coral reef science. About 2'500 people from 80 countries were participating and showed their results within the framework of 22 Symposia themes. I and Keita Koeda from Tachihara sensei's laboratory were holding our oral presentation in the "fish & fisheries" theme on the second day of the symposium. On the remaining days, I attended the oral presentations focusing on life history, reproduction and larval ecology, recruitment and connectivity of coral reef fishes and sharks.

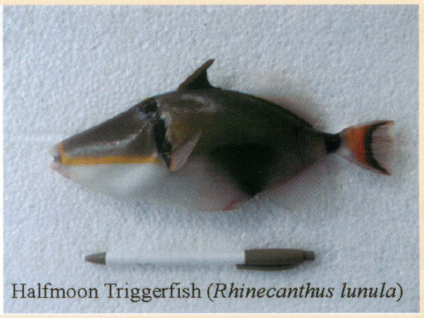
Triggerfish research - outline

The triggerfish family (*Balistidae*) is a highly modified and advanced group of fish and they are easily recognized by their characteristic deep-bodied and laterally compressed body form. Though the members of this family are mostly distributed in tropical seas in great variety and are considered to be an important component of the coral reef fish community, very little is known about their life history characteristics and habitat use. Acquiring biological information of fish species is necessary in order to describe their life cycle and species-specific strategies and to understand the role and importance in their habitat. Besides, several triggerfish species represent an important fisheries resource and are especially appreciated by aquariophilists due to their colorful appearance and aggressiveness.

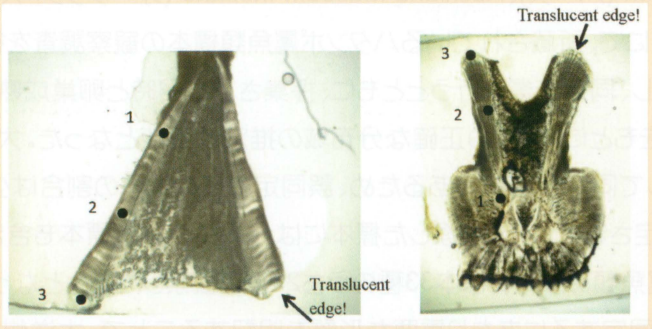
One part of the research abroad contained the sampling of the target species named Picasso triggerfish to get spine, vertebrae and gonad samples in order to obtain information about age and growth and reproductive biology. Those samples are not only very valuable for a comparison with my current data from Okinawa Island but since there are no published information available about basic life history aspects of balistids from Australia, the obtained data will contribute to a better understanding of the specific life cycle in geographically different locations.

Another part comprised the direct underwater observation of adults and juvenile Picasso triggerfishes. I was especially interested in the habitat occupied by small recruits. Based on my current results for the spawning season of the Picasso Triggerfish from Okinawa (May-September), I expected that the spawning season in the Great Barrier Reef had already taken place during the summer season in the southern hemisphere, thus around the beginning of the year.

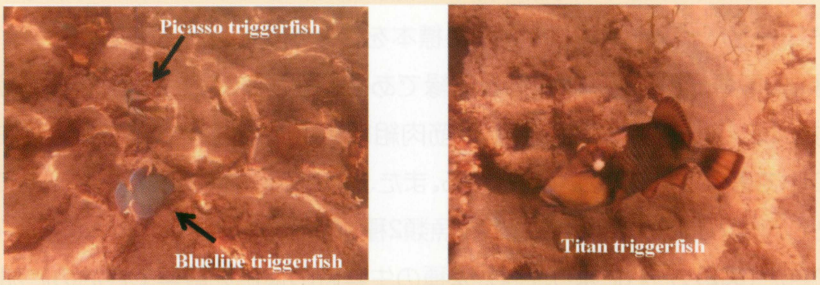

Picasso Triggerfish (*Rhinecanthus aculeatus*)


Halfmoon Triggerfish (*Rhinecanthus lunula*)

▲Totally 9 Picasso triggerfish (left) and one closely related species from the same genus (right) could be purchased. The distribution range of the Halfmoon triggerfish is restricted to Australia and Micronesia. It is a very rare species and literally nothing is known about its biology.



▲ The pictures show thin sections of vertebra (left) and the corresponding dorsal spine (right) of a female Picasso Triggerfish with totally 3 translucent year rings (146 mm in Standard length). The estimated age ranged between 3-8 years and totally seven individuals had a translucent band on the margin of sectioned spines and vertebrae. This is indicating that the fishes are laying down a year ring probably in the colder winter season, similarly to the triggerfishes from Okinawa.



▲In the shallow coral reef area of Green Island I could find three different species of triggerfishes during skin-diving: the Picasso triggerfish (Rhinecanthus aculeatus), the Blueline Triggerfish (Pseudobalistes fuscus) and the Titan Triggerfish (Balistes viridescens). The latter two species were still juveniles and probably using this habitat as a feeding ground since the bigger-sized adult species are usually found in deeper water. Interestingly, several juvenile Picasso triggerfishes (recruits of ca. 40-50 mm Total lengths) were spotted in the very shallow reef area. This is strongly indicating that the spawning season in this species took place about half year ago in the summer season.

4.Achievements:

The research trip including the participation in the symposium was a great experience with lots of impressions and new inputs, ideas and motivation gained for my research. Even though sample size of the purchased specimens was low due to the high prices achieved for ornamental triggerfishes, the so far obtained results are quite promising and are simply emphasizing the need for more specimens from different geographical parts of the world.

Even though the commercial sampling of live-stock from the Great Barrier Reef is strictly controlled, information about age, growth and reproductive biology is essential to establish and maintain a sustainable trading with coral fishes and especially to protect vulnerable and potentially vulnerable species from an over-collection.

大学院学生短期研修派遣（平成24年）

理工学研究科 海洋環境学 博士2年　小枝　圭太

推薦教員：立原　一憲

1. **研修先および研修受け入れ責任者：**オーストラリア・ニュージーランド, Mark McGrouther
2. **研修期間：**平成24年7月6日-8月30日
3. **研究内容：**

オーストラリアとニュージーランドに所在する4博物館機関Australian Museum (シドニー)、Western Australian Museum (パース)、Auckland Museum Institute (オークランド)、Canterbury Museum (クライストチャーチ)　にて、所蔵されているハタンポ属魚類標本の観察調査を行った。合計785標本の形態形質を計数、計測し、同定作業を行うとともに、採集された日時と卵巣成熟の有無を記録した。さらに、標本の採集場所をもとに、各種の正確な分布域の推定が可能となった。大洋州のハタンポ属魚類は、他の海域と比較して同定が容易であるため、誤同定された標本の割合は少なかったものの、依然として約30%は誤同定されていた。観察した標本には、6種のタイプ標本も含まれ、今回の結果により、現存するハタンポ属魚類のタイプ標本33種のうち29種を観察したこととなった。これらの形態を詳細に記載すると共に、同定するにあたり重要な形質を明記することで、大洋州におけるハタンポ属魚類の分類方法や分布域などを整理することが可能となる。また、成熟した個体や稚魚の加入時期から、南半球の大洋州では、産卵期が沖縄島とちょうど半年ずれていることが推測された。これは、後述したケアンズにおける潜水調査でも同様の結果が得られている。シドニー、パース、オークランドでは魚市場に行き、シドニーとパースでアオバダイ科の標本を購入することが出来た (図1)。

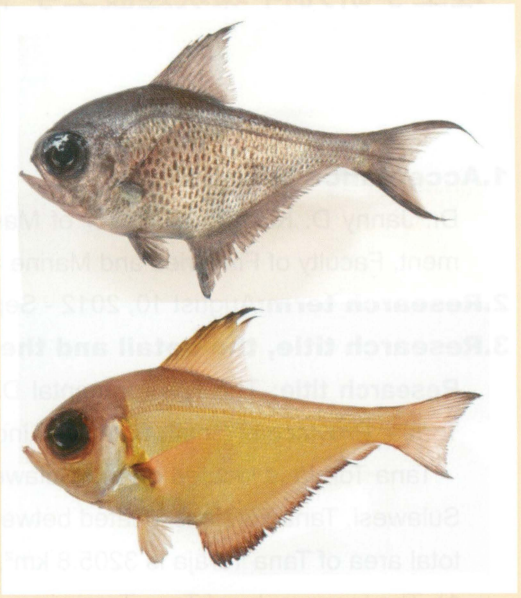
本科魚類は、形態学的にハタンポ科と近縁であると考えられているが、分子遺伝学的な裏付けはなされていない。これらの標本から摘出した筋肉組織を用いれば、ハタンポ科とアオバダイ科の系統類縁関係について考察することが可能となる。また、オークランド、ケアンズ、パースでは、釣りによる標本採集を試み、パースにおいてはハタンポ属魚類2種 (*Pempheris multiradiata, P. klunzingeri*)を採集することができた（図2）。これにより、これら2種の生鮮時の体色を観察できたのに加え（博物館所蔵標本は液侵標本のため体色は不明）、生鮮写真も得ることができ、また、筋肉組織からDNA解析も可能となった。

これらに加え、Auckland Museum InstituteとAustralian Museumに貯蔵されていた4種のDNA解析用筋肉組織を譲渡していただけることとなった。ケアンズにおける潜水調査では、沖縄島など北太平洋には広く分布するものの大洋州には分布していないと推測していた2種の分布が確認された。これらの2種は、沖縄島では本調査時期には本種の加入個体が数多く観察されるが、ケアンズではその数は非常に少ない、または観察されず、北半球と南半球における産卵期や稚魚の加入時期のずれが推察された。

▲図1 シドニー魚市場にて購入したアオバダイ科 *Glaucosoma scapulare* (上)と市場に並ぶアオバダイ科。

自力での標本の採集が困難なケアンズでは、観賞用熱帯魚販売業者Cairns Marinとコンタクトをとり、ハタンポ属魚類が採集された場合は、標本として購入することを交渉し、今後、ハタンポ属が採集され次第、連絡をいただくこととなった。また、International Coral Reef Symposium 2012に参加して口頭発表を行い、大洋州だけでなく、世界各国の海洋生物研究者と交流を深めることができた（図3）。

学会はもちろんのこと、各博物館機関にも分の足で訪問することの重要性を改めて感じた。電子メール等で連絡をし、標本の交換等の申請をすることは可能な場合もあるが、それでは、短期的な結果しか得ることができない。現地に行き、実際に会い、人間関係を形成することで、将来的にも長期にわたって協力できる重要な関係となるだろう（図4）。



▲図2 パース近郊で釣獲した*Pempheris multiradiata*（上）と*P. klunzingeri*（下）。

▲図3 International Coral Reef Symposium 2012での口頭発表の様子。

▲ 図4 a: Auckland Museum InstituteのTom Tronski博士; b: Canterbury Museum のPaul Scofild博士; c: Australian MuseumのFish Team（右から2番目が受入れ研究者のMark McGrouther博士）; d: Western Australian MuseumのSue Morrison博士とGlenn Moore博士。

大学院学生短期研修派遣（平成24年）

理工学研究科 環境建設工学 修士1年　Adrianus Bannepadang

推薦教員：堤　純一郎

1.Acceptance information:

Dr. Janny D. Kusen, Professor of Marine Biology, Department of Aquatic Bioresources Management, Faculty of Fisheries and Marine Science, Sam Ratulangi University, Manado, Indonesia.

2.Research term: August 10, 2012 - September 28, 2012.

3.Research title, the detail and the results:

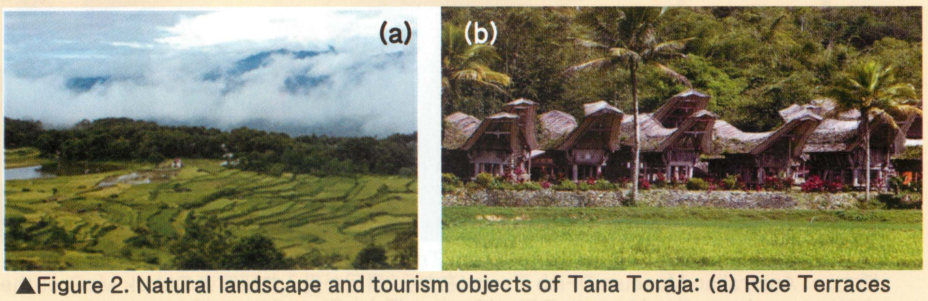
Research title: The Environmental Damage Effect on Development of Tourism Industry in Tana Toraja, Province of South Sulawesi, Indonesia.

Tana Toraja is located on the Sulawesi Island, north of Makassar, the provincial capital of South Sulawesi. Tana Toraja is located between latitude of 2–3 ° South and longitude 119–120° East. The total area of Tana Toraja is 3205.8 km², about 5% of Province of South Sulawesi, Indonesia (Figure 1). The topography of Tana Toraja is mountainous. The minimum elevation is 150 m, while the maximum is 3083 m above the sea level.

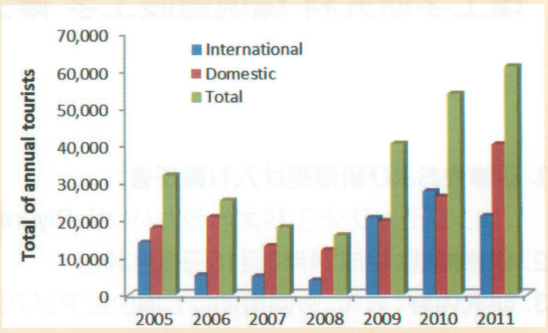
Tana Toraja is well known with various natural landscape and tourism objects, such as beautiful mountains view, rice fields with terrace, architecture of Torajan houses and unique culture of its people, and so on (Figure 2). Tana Toraja has been visited by many tourists for specific and interesting objects, as well as cultural uniqueness which differ from other places around the world. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), Tana Toraja has been nominated as one of world heritages in Indonesia (Reg. No. C1038, 2001) for its traditional settlement, consisted of compound of houses (tongkonan) and granaries (alangs), burials (liang), ceremonial grounds with menhirs (rante), rice-fields, bamboo forests, and grazing ground or pasture for buffalo and pigs.

▲Figure 1. Map of Tana Toraja, Province of South Sulawesi, Indonesia (pointed by A).

Tourism Board of Tana Toraja, Province of South Sulawesi recorded that number of visitors has been recently rapidly increased, particularly for last three years for both international and domestic (Figure 3). In the fiscal year of 2007 and 2008, the numbers of total tourists visited Tana Toraja were 18101 and 15936 people, respectively, and the number was double in the following year. In fiscal year 2011, the total visitors were 61064 people, or have been grown for more than three times compared to that of fiscal year 2007 and 2008. A slight decrease of international visitors was observed in 2011, from 27596 to 21027 tourists.



▲Figure 2. Natural landscape and tourism objects of Tana Toraja: (a) Rice Terraces Batu Tumonga , (b) Kete'kesu traditional Torajan village.



▲Figure 3. Number of tourists arrived in Tana Toraja, from fiscal year 2005 to 2011, obtained from Tourism Board of Tana Toraja, Province of South Sulawesi.(pointed by A).

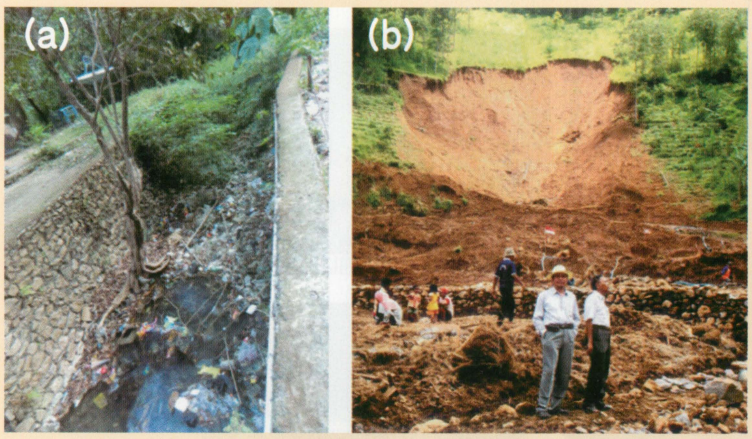
Tourism is known well as an activity which might promise a profitable effort of economically income to a country. However, the entry of large number of tourists to nature areas could damage the natural resources in the areas. It might be happened because the presence of tourists in an area of tourism could be created demand for several infrastructures such as water, electricity, telecommunications, accommodation, and so on. Constructions of these facilities involve uncontrolled exploration of land resulting in ecological disruption, such as destruction of flora and fauna habitats, water pollution and changes in soil nutrients. Unplanned development of tourist areas contributes to degradation in environmental quality such as deterioration of water quality, air, noise and damage to natural resources. These problems have also occurred in Tana Toraja, for example dirty canal caused by unmanaged waste from hotels surrounding tourism objects and landslide caused by deforestation (Figure 4)

4.Achievements:

This research intends to investigate the effective ways, firstly to conduct observations of environmental damage caused by tourism industry in Tana Toraja, and secondly to create a strategy on sustainable development that ensures the continuation of production and processing of natural resources and cultures, and therefore environmental policy making. Accordingly, this research field trip have brought ideas as follows:

1.The importance of integrated waste management for hotels, restaurants, and markets, and other public facilities related to tourism industry, as well as local houses.
2.The importance of rules and guidelines for development of area planning and urban design.
3.The importance of rules and guidelines for utilization of forest and other natural resources surrounding tourism objects.

This study is also part my thesis research, and I hope the result of this study can give a useful contribution to Indonesian government, especially to the local government and social community in Tana Toraja, Province of South Sulawesi, Indonesia.



▲Figure 4. Effect of development of tourism industry in Tana Toraja, Province of South Sulawesi on environmental problems: (a) dirty canal caused by unmanaged waste from hotels surrounding tourism objects, (b) landslide caused by deforestation, happened in Sep, 2012.

大学院学生短期研修派遣（平成24年）

理工学研究科 環境建設工学 修士2年　豊崎　孟史

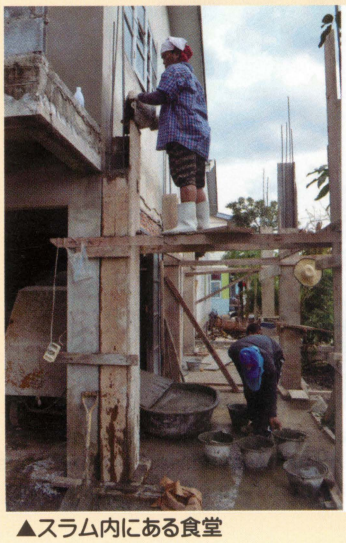
推薦教員：小倉　暢之

1. **研修先および研修受け入れ責任者：**
   キングモンクット工科大学ラカバン校 Piyarat Nanta先生
2. **研修期間：**平成24年8月15日-9月30日
3. **研究内容：**去年、今回援助して頂いたアジア太平洋域国際連携教育プログラムによりタイにて一ヶ月の調査を行った際に、タイ、バンコクのバンブアという低所得者層の不法占拠地区（通称:スラム）における、スラムコミュニティーの自立の仕組みについて明らかにした。今回はそのスラムの自立の仕組みを支えるスラムの人々のコミュニケーション方法に着目し、彼らが如何にして、親族同士、隣人同士、または隣り合ったスラムコミュニティー同士でコミュニケーションをとっているのかを実際にスラム住民やコミュニティーリーダーの方々にインタビューを通して聞くことができた。そして、建築的な観点からも、彼らの住む住居が既存の基本形から、彼ら独自に改良を加えて拡張していることからも、それらの拡張空間も住民同士のコミュニケーションになんらかの作用をもたらしているのだろうと考え、約170件もの住居の拡張部分についても現地で細かな現況を描きとめた。さらに、今回の調査では予定していたスラム以外に加えてフォーティライとバングラマという他の2つの地区のスラムにも行くことができた。
   フォーティライではバンブアと違った方法で自立する仕組みをスラム住民自ら作り上げており、バングラマでは政府とバングラマスラムが対立している最中を体験することができ、どれも非常で、普通では体験できないことばかりの一ヶ月半の調査だった。
   写真を以下に添付する。

【バンブアコミュニティ】

▲写真の右側が住居で、左側が住民の集まる休憩所のような場所

▲スラム内にある食堂



▲スラム内にある食堂

▲拡張部分を小さな畑に改良中

▲スラム内にある食堂

【フォーティライコミュニティ】

このコミュニティではゴミを収集し、細かく分別してお金に変えている。さらには、ゴミを小物に作り変えたり、住居を作る材料の一部にしたりと多様にリサイクルしている。

▲ゴミを分別

▲ゴミと交換できる売店の商品

▲ゴミの換金表

空き缶から作られたボックス（上）
ゴミの収集所兼売店（下）▶

【バングラマコミュニティ】

このコミュニティは政府との対立のまっただ中であった。その原因は、政府はスラムに隣接する鉄道の線路をリフトアップしようとしていて、その際、スラムの住民は立ち退きをしないと行けないらしく、立ち退くことが嫌な住民たちが集まってどのように対策を取るかの話し合いに立ち会えた。

▲意見を交わしている様子

▲周辺の模型を作って検討している

大学院学生短期研修派遣（平成24年）

理工学研究科 環境建設工学 修士2年　Tonmitr Nayatat

推薦教員：小倉　暢之

1.Acceptance information:

Prof. Dr. Nobuyuki Ogura

Department of Civil Engineering and Architecture, Faculty of Engineering, University of the Ryukyus, Japan. And the coalition with

Prof. Dr. Piyarat Nanta

Department of Architecture and Planning, King Mongkut's Institute of Technology Ladkrabang (Kmitl), Thailand.

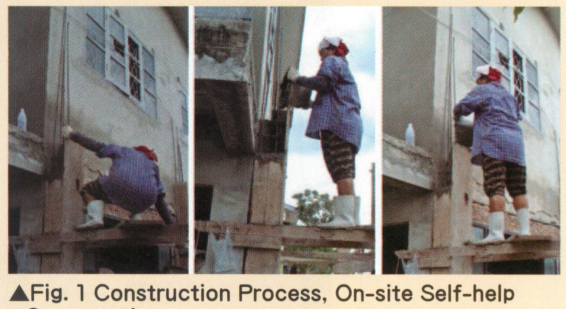
2.Research term: The research has been conducted during 15th August- 30th September 2012.

3.Research title, the detail and the results:

Title: Low-income, the Grass Root Housing Research in Thailand

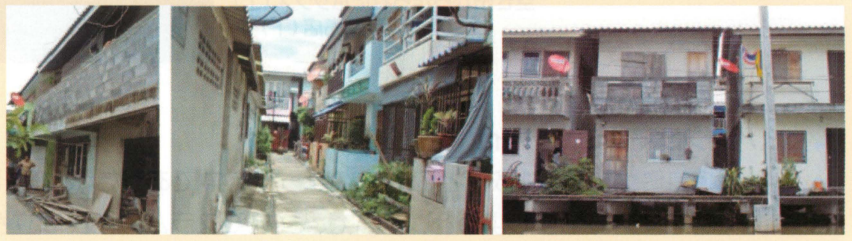
Details of the Research

Low-income housing is becoming increasingly focused as a topic of discourse, particularly, housing for the grass root people that form great part of the country. Low-income habitation is one of the most imperative issues for the development process of the country. As for Thailand where the demand of land for housing the poor is becoming increasingly high. The research has major conducted in Bangkok, the metropolitan city of Thailand where the requisition of residence is very high, and very high in population density. The three major sites have been conducted a research on.



▲Fig. 1 Construction Process, On-site Self-help Construction

Bang Bua community where is located in Bang Khen area. Bang Bua community is waterfront settlement where is situated near the canal. This housing project is slum development project under the patronization of Community Organization Development Institute (CODI) that has been separated the task from the National Housing Authority (NHA). This community has depended on the bottom-up enhancement process which is the community participatory design approach with the real dwellers and the planners. Therefore, there are many of project discussion, negotiation and revision until getting the final master plan and starting the construction phase. Self-help housing approach has been determined for this slum housing project. After the construction has been done, still there is the design monitoring and community participation process.



▲Fig. 2 Bang Bua Housing Characteristics, Inner Alley, Physical Appearance

The next low-income housing project is renowned as 14 rai community, where is located in Aounnuch 14 rai in Bangkok of Thailand. In the past, this community has been got eviction from under the bridge area, thereafter moved to the present project location. There is the unique kind of management that the community members run cooperative together by turning the trash into the money. It is due to most of the background of the community resident is garbage collector. It was formed the zero baht shop for supporting of this process and there is also the daily life vegetable farm that is able to be shared within the community. Furthermore, there is the value-increased process for the recycle and re-used material; it can be turned into the product, cap, hat, bag, or even roofing material for instance.

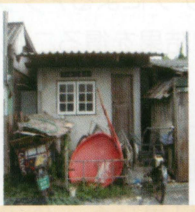
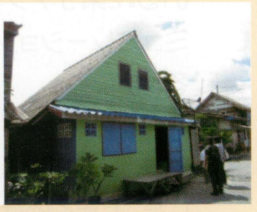
Therefore, it is a kind of self-autonomy community combined with some of the outside patronizations. The building characteristics vary from house to house according to difference kind of affordable materials. Housing material depends on the affordability, availability, practicality and the dwellers' requirement.


▲Fig. 3 Zero Baht Shop, Trash Trading Process



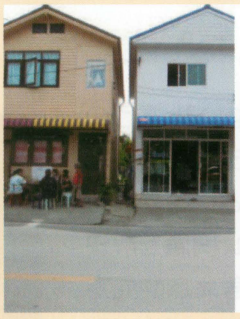
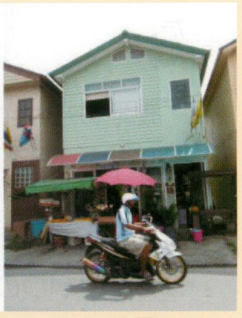
▲Fig. 4 Turning Trash for Cash Process, Value Added Products


▲Fig. 5 Community Vegetable Farm (Left), Re-used Roofing Material (Right)

▲Fig. 6 14 Rai Community Housing Characteristics Process

The third major site, Bangramard community is located in Bangkok. Its contextual location is railway community. So far this community has been developed, rearranged and redesigned till the present characteristics. The land negotiation has been done with the State Railway of Thailand (SRT) and dwellers are able to get longer term of rental land right than it has ever been before. The buildings were also done by self-help construction process.

▲Fig. 7 Bangramard Community Housing Characteristics

4.Achievements

Results and Research Achievements

Housing for the grass root people in Thailand is foremost in the circumstances of land eviction. It is therefore land secured tenure is the imperative issue to have a scrutiny on. How to gain the legal land right for long term residence is very significant. Hence many of the procedures have been done including negotiation, group forming and network alliance. Moreover, the housing design process has depended on the design participatory approach so that to suit the real demand and requirements of the real users.

This international research opportunity allows researcher to gain the wonderful period of time to broaden the outlook of housing for low-income people experience. Additionally, it helps to strengthen the practical research skilled and empower the connection among many of the key persons for the near future research contributions.

Acknowledgement

The appreciation directs to the International Graduate Program for Asia-Pacific Region, University of the Ryukyus for provision of the great opportunities and wonderful period of time abroad. My thankfulness goes towards to Prof. Dr. Nobuyuki Ogura and Prof. Dr. Piyarat Nanta for research coalition experience.

大学院学生短期研修派遣（平成24年）

理工学研究科 情報工学 修士1年　志村　友衣

推薦教員：和田　知久

1. 研修先および研修受け入れ責任者：
ベトナム ハノイ工科大学 Pham Hai Dang

2. 研修期間：平成24年9月3日-11月3日

3. 研究内容：

私の研究タイトルは「アダプティブアレーアンテナを利用したISDB-T受信システムの検討」である。

MATLABを使用し、地上デジタル放送の移動体受信装置のシミュレーションを行なっている。目的は高速移動体上での受信信号のノイズを減らすことである。更に2素子ということでコスト削減も狙っている。2素子アンテナによるアダプティブアレーアンテナ技術を利用することで従来方式よりも良いシミュミレーション結果を得ることができた。現在はそれを更に改良したシステムの検討を行なっている。

良いシミュレーション結果を得ることができた前回はアンテナ受信信号抽出に用いる重み係数の導出を夫々別々の回路を用いて行なっていたが、今回はそれを1つの回路から導出する為の方法を検討した。上手くゆけば更なるコストの削減が可能となる。

今回の短期研修派遣では、派遣先の研究室の学生だけでなくゲストハウスを通じてホーチミンといった他の地域から来たベトナム人や日本人、インドネシア人、ラオス人と交流を持つことができ、沢山の友人を作ることができた。違う文化の下で生きてきた人々と交流を持つことは、その考え方や生き方も勉強になった。

また、日本とは違う文化的側面から日本の技術について考え直させられる機会も多く勉強になった。

現地の方は「“ない”と言うのではなく、あるもので補えば良いじゃないか」という考え方が多く見受けられ、問題を解決するときに1つの考え方や見方に固執するのではなく全く別の方面からのアプローチを考えて見れば良いということに気付かされた。これは今後研究を進めるうえで非常に有意義であった。

今回の留学は学ぶことが非常に多かったがその中でも一番勉強になったのは、自分で限界を決めずに挑戦してみることで意外と上手くいったり世界が開けるという感覚に気付けたことだと言える。

理工学研究科 海洋環境学 博士2年　Yang　Sung-Yin

推薦教員：James Davis REIMER

1.Acceptance information:

Dr. Chaulun Allen Chen, Academia Sinica, Taipei, Taiwan

2.Research term:2012/Sep/14 -2012/Nov/15, two months

3.Research title, the detail and the results:

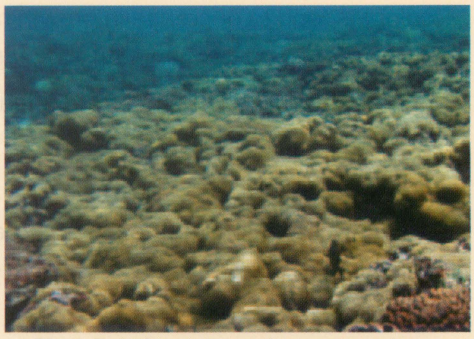
Research title

Population dynamics of Palythoa tuberculosa in the Kuroshio region

Research content

A common reef sessile animal group, Zoanthids (Cnidaria: Anthozoa: Zoantharia: Zoanthidea), is related to hard corals and share many biological functions and geographic distributions. Although zoanthids and corals share similar spatial and temporal niches, zoanthid ecology has rarely studied and previous research has focused on the Western Atlantic and the Caribbean, but not on the Pacific. One genus of zoanthid, *Palythoa,* has high growth rates, are considered aggressive competitors because they use both physical and chemical strategies to outcompete benthic organisms. Recent report shows that outbreaks of one species *P. caribaeorum*, is increasingly occurring in the Caribbean (Brown pers. com.), but what causes the outbreak is still unclear. *Palythoa* may prefer high nutrient environments, as demonstrated by Costa (2008) who concluded that nutrification along the coasts of Brazil was a reason for the dominance of *P. caribeaorum.*

Palythoa may alter the reef structure by reducing the complexity through overgrowth (Mendonca-Neto et al. 2008), or compete with the recruitment and settlement of benthic organisms or zooplankton through to active feeding (Sebens 1977). Furthermore, *Palythoa* contain palytoxin, which has found in other reef organisms where it circulates and accumulates in food chains among reef animals, and can cause food poisoning (Mebs 1998). Due to the rapid degradation of the reefs in the Indo-Pacific region causing by both natural and anthropogenic effects, for future reef management, understanding the roles that *Palythoa* plays in the reef environment and how this may influence the dynamics with other benthic organisms is crucial.

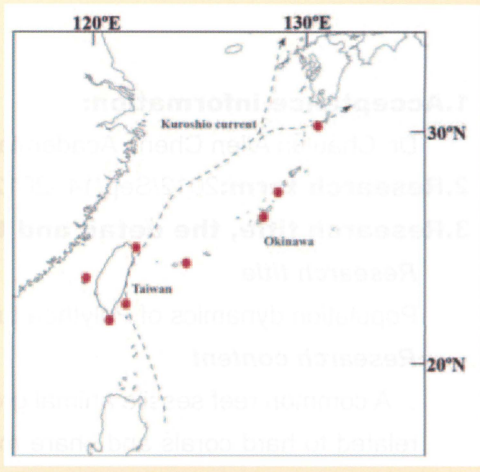


▲Fig.1 *Palythoa tuberculosa* colony in Okinawa.

The common species in the Indo-Pacific Ocean, *P. tuberculosa*, has found to have high density in some locations at Okinawa shallow area (Fig. 1) (Irei et al. 2011). Additionally, the influence of Kuroshio current on marine benthic organisms reproduction is still requiring studies on more species, it will be practical to study the population dynamic of *P. tuberculosa* in the Kuroshio region. Therefore my research aims to study the population and reproduction dynamics of Palythoa tuberculosa in Kuroshio region (Fig. 2). The first step will be to elucidate how population changes in *P. tuberculosa* are related to environmental factors that also affect the composition of benthic communities. Following survey of the population recruitment ranges and sources will be investigated to understand reproduction dynamics.

Materials and Methods

The first part of this study requires field observation and environmental data collection. Target P. tuberculosa colonies from five sites at Okinawa (Makiminado, Convention Center, Mizugama, Manza, and Bise) are marked and recorded using 50 ×50 cm frame to analyses physical changes in the colonies. Phototransects are taken among those marked P. tuberculosa for analyzing the surrounding benthic community composition. Water parameters of water temperature, light, pH values, particulate organic matter (POM), dissolved oxygen (DO), chlorophyll a, phosphate, nitrate, nitrite and ammonium are also taken. This part of research is recorded in different seasons for one year.

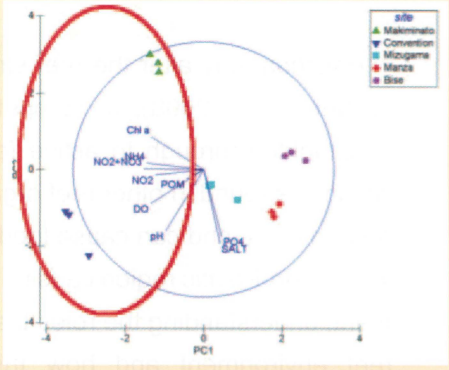


▲Fig.2 Map of the sample sites (marked red points), and the path of Kuroshio current.

The second part requires to obtain information on the possible population ranges and sources of recruitment. Here I applied Microsatellite markers for molecular population genetic research. This will be carried out using thirty samples of Palythoa populations from different locations of Okinawa and other locations (Ishigaki-Jima, Okinaerabu, Yaku-Jima), Taiwan (Yeliu, Green Island, Kenting and Penghu) (Fig. 2).

Results

The preliminary result of the first part shows the growth rate of P. tuberculosa colonies has no significant different among different sites, despite the water quality of Makiminato and Convention Center has higher nutrients input then other three points (Fig. 3). However, the growth rate is more related with size of the colonies, as bigger colonies tend to decrease in growth rate (Fig. 4). Microsatellite markers are still under development, around ten primer sets will be chosen for population genetic study.

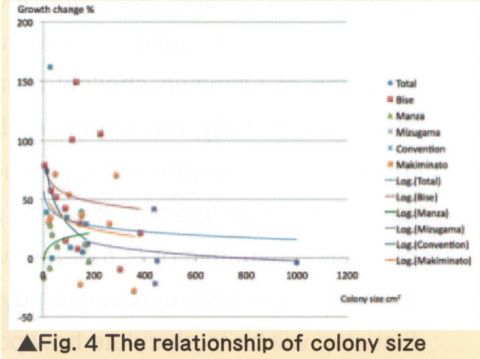


▲Fig. 3 Water quality PCA of 2012 Spring

4.Achievements:

During the short-term exchange period, I accomplished collecting samples around Taiwan with DNA extracted, selection for microsatellite markers, meanwhile analysis some of my data for my first part research.

Papers of the first part experiment are still under construction. However the prelimanery reults has presented in 15th Japenese Coral Reef Society Symposium for poster section.



▲Fig. 4 The relationship of colony size with growth change in each location.

理工学研究科 海洋環境学 博士1年　Abdullah Muhamad Fadry

推薦教員：今井　秀行

1.Acceptance information:

Dr. Yusli Wardiatno, Head of Department of Living Aquatic Resources Management at Faculty of Marine Science and Technology, Bogor Agricultural University (IPB)

Mr. Adi Nexon Tomyan Langga, Staff of Department of Marine Affairs and Fisheries, East Nusa Tenggara (NTT) Province, Indonesia.

Mr. Ismail, Lecturer of the Sorong Fisheries Academy, West Papua, Indonesia.

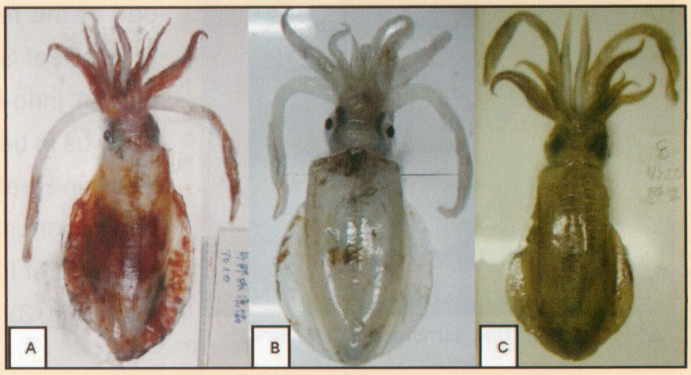
2.Research term: September 19, 2012 . October 6, 2012

3.Research title, the detail and the results:

Research Title:

Biogeography and Phylogenetic Research of Bigfin Reef Squid "*Sepioteuthis lessoniana*" Species Complex in Indo-Pacific Ocean.

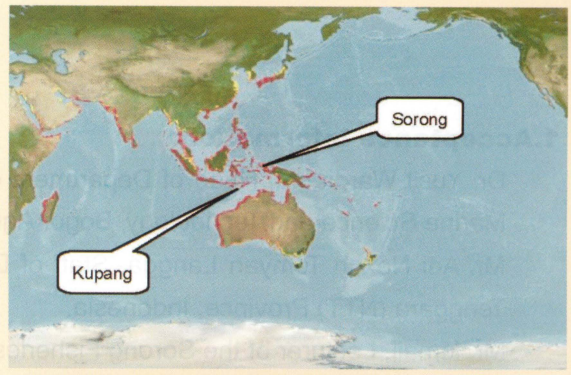
The bigfin reef squid *Sepioteuthis lessoniana Ferussac*, 1831 in Lesson (1830.1831) is widely distributed in the Indo-Pacific, where it is a very valuable fishery resource (Dunning, 1998). Thus, a lot of ecological researches of this species were reported (e.g. Ikeda, 1933; Choe & Ohshima, 1961; Segawa, 1987; Ueta, 2003; Ikeda et al., 2009). Segawa et al. (1993a; 1993b) showed that within Sepioteuthis lessoninana have differences of egg characteristics and reproductive trait in Ishigakijima Island. Izuka et al. (1994) reported an allozyme analysis found so-called S. lessoniana around Ishigakijima in Okinawa Prefecture, Japan, includes at least three biological species (Figure 1). Local fishers call the three species "*aka-ika*," which has a red body, "*shiro-ika*" or "*aori-ika*," which has a white body, and "kua-ika," which is smaller than the other two. Of these, the range of "*shiro-ika*" extends to the coast of the main Japanese islands. This is the extent of its taxonomic classification thus far. This is due in part to the limited number of distinguishing morphological characters but also because the type specimens is no longer available and type locality has not been designated (Lu et al., 1995; Jereb & Roper, 2006). This makes it difficult to determine whether genetically recognized species are undescribed species or one of 13 known synonymies (Young, 2002). In this study, we treated "aka-ika" as Sepioteuthis sp. 1, "shiro-ika" as Sepioteuthis sp. 2, and "kua-ika" as Sepioteuthis sp. 3.



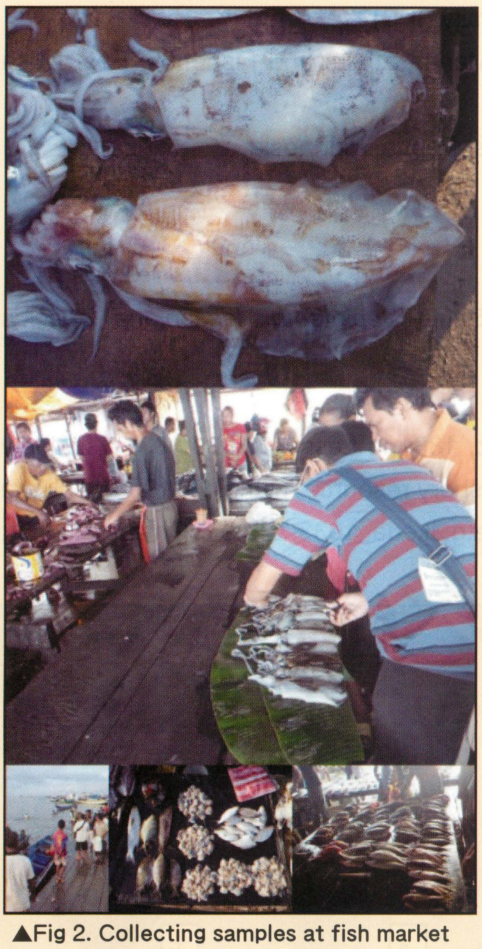
▲**Fig 1. A: *Sepioteuthis* sp. 1, B: *Sepioteuthis* sp. 2, and C: *Sepioteuhis* sp. 3,**

In order to initiate the studies, we intend to begin from biogeography and phylogenetics research of Bigfin Reef Squid "Sepioteuthis lessoniana" Species Complex in Indo-Pacific Ocean. As type locality for this species is in Irian Jaya (Papua), it is necessary to collect the samples from Indonesia especially from type locality location.

Bigfin Reef Squid were collected from local fish market. We also had opportunity to understand common fish that caught by Kupang and Sorong fisherman from the research sampling trip.



▲Fig 1. Sepioteuthis lessoniana distribution area in Indo-West Pacific and sampling sites in this study



▲Fig 2. Collecting samples at fish market

4.Achievements:

In this sampling trip we had successfully conducted research sampling in two locations in Indonesia; Kupang, East Nusa Tenggara and Sorong, West Papua (Fig. 1 and Fig. 2). Besides sampling trip, we also got the opportunity to visit fish market to understand common fish that caught by fisherman and field observation is also great experience that obtained from the trip. The output of this study will be a part of the research of biogeography and phylogenetic of Bigfin Reef Squid "Sepioteuthis lessoniana" species Complex in Indo-Pacific Ocean. This research will essentially allow us to better evaluate our study of the species complex in Bigfin Reef Squid. In this research sampling trip we also had opportunity to meet Indonesian researcher and university lecturer to discuss and strengthen our research cooperation (Fig. 3).

▲Fig 3. Acknowledgement; We would like to thank for help on this study trip Dr. Yusli Wardiatno and Dr. Mukhlis, Bogor Agricultural University (left photo), Mr. Adi Nexon Tomyan Langga, Department of Marine Affairs and Fisheries, NTT Province (middle photo) and Mr. Ismail, the Sorong Fisheries Academy (right photo)