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CONTENTS

Page

Introducing My Research

KAWAI, K.: Research in the Kagoshima and Pacific Islands.....1

Research Seminars4

Recent Publications8

Cover photo: Ring of Brodgar Stone Circle, Orkney Islands, Scotland, November 2004 (by Hiroto TAKAMIYA)

INTRODUCING MY RESEARCH

Research in the Kagoshima and Pacific Islands

KAWAI Kei

International Center for Islands Studies, Kagoshima University

The status of the Earth's environment and its future can be interpreted from different perspectives. One of these posits that the Earth is home to different ecosystems, each of which provides ecological services that are necessary for the survival of biota in these ecosystems. The importance of these services have been evaluated and categorized as foundational, supply, adjustment, and cultural services. Moreover, sustainable development goals (SDGs) announced by the United Nations in 2015 are important frameworks for promoting sustainability. The SDGs include 17 goals that can help countries achieve environmental, economic, and social sustainability.

To achieve these objectives, research was conducted on coastal areas of the Kagoshima and Pacific Islands. These islands have high biodiversity and many people living in their coastal regions where mangrove forests, coral reefs, and tidal flats, among others, are found. Therefore, the coastal region is a good model for studying the ecology of animals and the relationships between animals, nature, and humans. The three studies conducted are described in the following sections.

1) Bivalve (*Anadara* spp.) Movement from the Fishing Grounds onto Land in the Fiji Islands

Coastal fisheries are an important commercial industry for the local people in the Pacific Islands and many studies have been conducted regarding the sustainable use of such resources in relation to the SDGs. Previous studies have indicated that coastal fisheries play an important role in the socioeconomic and ecological systems of coastal areas in the Pacific. For example, the eastern coast of the Fijian island of Viti Levu is densely populated with filter-feeding bivalves (*Anadara* spp.), which are an important food and income source for

the local people. Women collect the bivalves and sell them in local marketplaces. In addition, the bivalves filter out particulate matter that is suspended in the water, thereby improving water quality. Thus, the harvesting and sale of these bivalves can influence the physical environment of both the coastal and inland regions. This process can be traced through fishing activities that transfer materials from the fishing grounds onto land in a complex overall system consisting of humans and nature in coastal regions.

The objective of the study was to investigate the structure and function of the system with regard to the movement of marine products from the fishing grounds onto land. We focused on fishing activities involving bivalves. Surveys were conducted in two villages from 2017 to 2019 to gain a better understanding of the onshore movement of bivalves in eastern Viti Levu. The onshore movement of marine products from the fishing grounds via fishing activity was influenced by both natural and socioeconomic factors, including the marine resource ecology, the current market economy, family members, social structures, and waste management practices. The findings indicate that the ecosystem has been affected by many factors, which suggests that the current structure may be unstable.

The guiding principles that should be enacted in order to maintain a sustainable, functional relationship between the people and their environment from the perspective of SDGs and bivalve fishing activity are currently under discussion. We may conclude that this bivalve species is a good indicator for addressing SDGs in coastal regions of the Pacific Islands.

2) Shell Color Polymorphism in Intertidal Gastropod *Nerita plicata* (L., 1758) Populations in the Cook Islands

The gastropod *Nerita plicata* (Fig.1) is widely distributed across the Indo-Pacific Ocean's upper intertidal zone and exhibits shell color polymorphism. This study examined the shell color diversity of *Nerita plicata* according to the substrate type (i.e., basalt or beach rock). This study was conducted on the islands of Rarotonga (August 2008 and August 2018) and Aitutaki (September 2009) in the Cook Islands. Three different shell color morphs (fully black-banded, partially black-banded, and fully white) were observed on basalt and beach rocks, with different distribution frequencies in each of the two habitats. The shell color distribution frequency of *N. plicata* was closely related to the habitat type, with white shells occurring more frequently on the light-colored beach rocks than on the dark-colored

basalt. The relationships between shell color polymorphism and environmental and genetic factors are discussed in this study as well as the potential role of humans in habitat changes that drive shell color polymorphism.

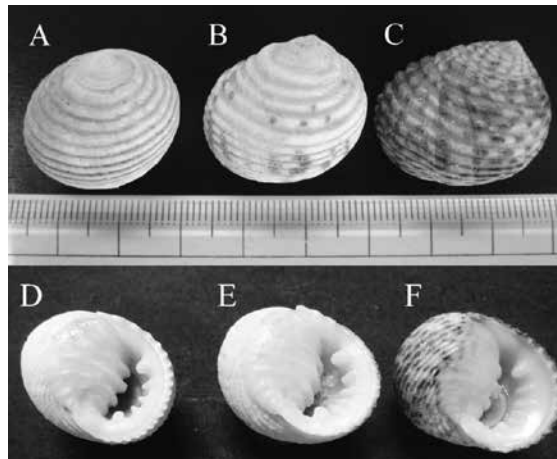


Fig.1. *Nerita plicata* showing color polymorphism

3) Biology and Ecology of Shellfish Inhabiting a Tidal Flat in Sumiyo, Amami Oshima Island, Japan

On Amami Oshima Island, in southern Japan, heavy rainfall on October 20, 2010 produced an influx of sand, which flowed into the sea near the tidal flat in Sumiyo and caused major damage to the island's fisheries. Effects of the flood damage on the organisms and environment of a tidal flat were investigated by comparing the results of a survey on the biology of infaunal shellfish, seawater, and soil properties in Sumiyo (December 2009) with similar data recorded after the sand influx (February 2011 and March 2016).

After the flood damage, many seashells were scattered across the tidal flat, and the density of living individuals decreased significantly from 1.50 (/250 cm²) prior to the flood to 0.89 afterward. The average shell length was almost unchanged: 15.40 ± 1.03 mm prior to the flood and 16.93 ± 1.11 mm afterward. This indicates that the shellfish died regardless of their size, rather than in a size-related fashion. The flooding had a large impact on the infaunal bivalves in the tidal flat. However, a certain number of individuals survived. Subsequently, these individuals exhibited a recovery trend.

Research Seminars

No.203, 28 September 2020

“Ecology and Evolution of Flowers in the Intra- and Inter- Specific Context”

Shuntaro WATANABE (Faculty of Sciences, Kagoshima University)

[ABSTRACT]

Flowers are the most diverse structures produced by angiosperms, and floral traits provide some of the most compelling examples of evolution by natural selection. However, to elucidate how these diversities maintain through natural selection is still a challenging issue because natural selection often act as a limiting mechanism for genetic diversity. Recent ecological theory suggests that frequency-dependent selection, which is an evolutionary process by which the fitness of a phenotype or genotype depends on the phenotype or genotype composition of a given population, is an important mechanism that determines the maintenance and loss of biodiversity such as maintenance of sex or interspecific competitive exclusion. In this seminar, I will discuss how evolution can contribute to the maintenance of floral diversity from the perspective of intra- and inter-species interactions.

No.204, 19 October 2020

“Issues and Producers’ Behavior on Tankan Marketing in Amami Oshima”

Jaehyeon LEE (Faculty of Agriculture, Kagoshima University)

[ABSTRACT]

This is a case study of producers and shippers relating to production and sale of Tankan as fruit in Amami Oshima. A survey was carried out with the goal of revealing the features of producers’ behavior seen on the Tankan marketing and the difference of market performance in each shipper. The results of this study can be summarized as follows. Firstly, the wholesale market does not play a role of raising the level of quality and maintaining stable price due to loose marketing standard requirements and limited purchasers. Secondly, the large-scale farms tend to be reluctant to joint sales of the Japan Agricultural Cooperatives (JA) because they have their own channels for sale. Thirdly, nevertheless the JA have been improving quality, securing sales channels, and increasing added value, but the joint sales of the JA still have decisive problems such as less and unstable volume of products under producers’

opportunistic behavior.

No.205, 16 November 2020

“An Introduction to the Activities of the 3710 Lab That Connects People and the Sea through Learning”

Kouta KANNO (Faculty of Law, Economics and Humanities, Kagoshima University/ 3710Lab)

Kodai TAGUCHI (Center for Ocean Literacy and Education, Graduate School of Education, The University of Tokyo/ 3710Lab)

[ABSTRACT]

KANNO and TAGUCHI were high school classmates at Sendai—the high school in a neighborhood called Kawauchi in Sendai. Later, KANNO and TAGUCHI aspired to study biology and educational philosophy, respectively. In addition to biological research, KANNO studied science communication (SC), an activity that conveys science to non-specialists, as a minor. After that, KANNO has continued to work on several original SC projects.

TAGUCHI became involved in marine education as a philosopher of education, and started a project called 3710Lab, which is introduced here. In the last few years, he has been working with high school students in Miyagi Prefecture and on the islands of Kyushu. He has conducted workshops to rediscover local culture, and a result of these workshop for classes at Yoron High School in Kagoshima Prefecture has been published as a book, *The Days of Yoron*.

No.206, 7 December 2020

“Discovery of Indigenous Environmental Education in Amami”

Yuko OGURI (Faculty of Law, Economics and Humanities, Kagoshima University)

[ABSTRACT]

The purpose of this presentation is to show the overview of the environmental education study that the presenter is now working at Amami Oshima. The study trend of the environmental education during these approximately 60 years, expanded the subject of the study interest to 1) the transformation of the one’s behavior, 2) a modification of the social structure, and to 3) the ontology of the human being. In recent years study trend for acquisition of the different view of the world among human and nature relationships is developing under

the name of “indigenous environmental education”. The studies aim to change the recognition of human control over nature and considering nature as the source of the wealth.

The presenter aims to identify the “indigenous environmental education” in context of Japan that originally was advocated by western society. Specifically, the presenter attempts to clarify both the knowledge system and the way of knowing that come from land of Amami Oshima where traditional culture still remains in density in each community.

In the presentation, the presenter first briefly introduces the above-mentioned study trend, and then, examines the contents of “100 interviews on the environmental culture of Amami” that she worked on in 2019. By discussing the influences of life experience with nature to one’s recognition, the presenter will address the possibilities of indigenous environmental education in Amami.

No.207, 18 January 2021

“Risk and Prevention of COVID-19”

Junichiro NISHI (Kagoshima University Graduate School of Medicine and Medical and Dental Sciences)

[ABSTRACT]

In islands of Kagoshima Prefecture, several group infections including three COVID-19 big clusters in Yoron and Tokunoshima were observed since July 2020. A total of 205 persons infected by SARS-CoV-2 were reported in the area of islands (as of Dec 26, 2020), accounting for 21.7% of all persons with SARS-CoV-2 in Kagoshima Prefecture. The incidence of COVID-19 in the islands was 2.5 times higher than in the mainland of Kagoshima. The higher incidence in the islands are ascribed to the import of SARS-CoV-2 by travelers and intimate communication among island persons. There were many group infections in eating and drinking establishments and subsequent household infections.

The main infection route of COVID-19 is droplet infection, in which aerosols carrying virus are inhaled at close range. Loud conversation in confined spaces with poor ventilation is high-risk for COVID-19. However, COVID-19 is hardly spread in common social life. In Kagoshima, the number of solitary cases infected by SARS-CoV-2 were 124, while that of groups with links to each other were 83, suggesting that major part of persons with SARS-CoV-2 did not infect any other persons.

Although a variant strain with stronger infectivity requires considerable attention,

excessive infection control is detrimental. It is important to develop a targeted infection control measure, such as preventing convivial party in a confined space. In addition, COVID-19 vaccines should be introduced after scientific validation of efficacy and safety in Japanese. To maintain favorable features of islands, feasible infection control with clemency is needed.

No.208, 15 February 2021

“Development for Cooperation and Education Models between University and Local Community: Shimo-Koshiki Island Project”

Akihiro YOSHIDA (Faculty of Law, Economics and Humanities, Kagoshima University)

[ABSTRACT]

During the university’s third medium-term goal period, the Faculty of Law, Economics and Humanities worked on establishing a new educational program for humanities and social studies aimed at developing human resources in southern Kyushu and the Nansei Islands over a four-year period from 2016 to 2019. The purpose of this project is to provide students in the Department of Humanities with coordinated geography education by linking lectures, tutorials, experiments, and fieldwork, and to construct an educational model aimed at regional cooperation with merits for both the university and local communities. In the project, problem setting for the students’ geography fieldwork was done on the basis of the needs of the local government and local community, and students spent one week every year in the village of Teuchi on Shimo-Koshiki Island, part of Satumasendai-shi, Kagoshima-ken. Each year the students gave the results of their fieldwork at a presentation session to which the local people were invited. Carrying out this long-term project not only improved the students’ degree of mastery of knowledge and technology in the field of geography, but also greatly affected their course after graduation having become more eligible manpower for the region through finding the solutions to the area’s problems while engaging with members of the local community. At the same, the students’ fieldwork became a good opportunity for members of the local community to think about the different problems they face and to hear the opinions of young people about them. This paper gives feedback on the results of the project on Shimo-Koshiki Island over the four years.

Recent Publications

+++ Journal +++

South Pacific Studies Vol.41, No1/2, 2021

Research Papers

TAKAMIYA, H. and NAKAMURA, N.: The Beginning of Agriculture in the Ryukyu Archipelago

+++ Kagoshima University Tushoken Booklet +++

No. 12 SUZUKI H.: Crustacean decapods in Kagoshima (March 2020)

No. 13 YANAGAWA H.: Introduction to Amami Shimauta (March 2020)



Kagoshima University Tushoken Booklets No. 12 and No.13

KAGOSHIMA UNIVERSITY
INTERNATIONAL CENTER FOR ISLAND STUDIES

1-21-24, Korimoto, Kagoshima, 890-8580 JAPAN ●

TEL: +81-99-285-7394

FAX: +81-99-285-6197

E-mail: shimaken@cpi.kagoshima-u.ac.jp

Website: <http://cpi.kagoshima-u.ac.jp/index.html>

鹿児島大学国際島嶼教育研究センター

郵便番号 890-8580

鹿児島市郡元1丁目21番24号

電話 099-285-7394

ファクシミリ 099-285-6197