



GCOEアジア保全生態学 九州大学・東京大学
Education, Research & Conservation

Introduction of new members of GCOE - RA in the 2012/2013 academic year

We have new members of GCOE-RA (Research assistant) in this academic year. We asked them for self-introduction.

Name: Furuichi Sho

Affiliation: Laboratory of Ecology, Department of Biology, Faculty of Sciences, Kyushu University

“Introduction of myself and my research”

I am a first-year doctoral student. I am interested in behavioral ecology, especially in how prey animals prevent predation and how predators attack the prey that exhibits anti-predator



behavior. I am now studying how parents prevent nest predation and how nest predators attack the nest defended by parents, using a paper wasp *Polistes chinensis antennalis*. *P. chinensis antennalis* is a paper wasp common in urban areas of Japan, with an annual colony cycle. A foundress queen of the wasp founds a nest and rears a brood alone in

spring. She needs to leave the nest to gather resources such as food for larvae. However, when she is absent from the nest, there is a risk that larvae in the nest are depredated by conspecific females of other nests. The conspecific female pulls out a single larva then returns to her nest and feeds her own larvae with it. When a foundress queen is present on the nest,



she can chase off attacking conspecific females. Foundress queens face a conflict between foraging and nest guard. I am now studying how foundress queens detect predation risk and prevent nest predation, and how conspecific females attack other nests.

Name: Taisuke Kanao

Affiliation: Entomological laboratory, Bioresource and Bioenvironmental Sciences

“Taxonomic revision and phylogenetic relationships of termitophilous rove beetles (Coleoptera: Staphylinidae)”

My study interests are taxonomy, phylogeny and evolutionary biology of termitophilous rove beetles. Many insects, across 12 orders and approximately 40 families, are known to have association with termites, and they are called as termitophiles. Among them, the most diversified taxon is the subfamily Aleocharinae (Coleoptera: Staphylinidae). More than 650 species at least in 17 lineages of termitophilous rove beetles are described (Kanao, unpublished data). In addition, it is considered that many undescribed species remain especially in the tropical and subtropical regions

As well as species diversity, morphological diversity of termitophilous rove beetles is particularly high. We can observe two unique convergent characters, physogastry and limuloid body form (photos). These are considered as mimicry for their host termites and defensive form, respectively. In addition, rove beetles exhibit many apomorphic and other convergent characters for each termitophilous lineage.

Such morphological diversity accompanies taxonomic difficulties. Most of termitophilous



lineages are assigned to particular higher-level taxon, such as tribe and subtribe, due to their convergent characters. Moreover, the phylogenetic relationships between termitophilous taxa and non-termitophilous aleocharine taxa are almost not known because quite modified morphologies make it difficult to choose phylogenetically informative characters. This situation prevents further studies on the evolution of termitophilous rove beetles.

Phylogenetic analysis is essential to solve this problem. Also, it is necessary to investigate probable species diversity and get enough materials for reliable estimation of phylogenetic relationships. Therefore, I conduct the long-period field research in the regions which have not been studied ever as well as the regions which have been already studied. Then, I analyze the systematic position of termitophilous taxa in the subfamily with morphological and molecular data.

My previous study indicates that the present taxonomic system of aleocharine systematics may tend to overemphasize the unique characters of each termitophilous group. It is possible that some termitophilous taxa will be contained to other large and free-living taxa. I inspect the possibilities and revise the systematics of termitophilous rove beetles by above methods. (Photo: Takashi Komatsu)

Name: Tatsuya Mishima

Affiliation: Department of International Society and Culture, Graduate School of Social and Cultural Studies, Kyushu University

“Food preference and morphology of digestive tract in the larvae of lucanid beetles (Coleoptera)”

Research contents: Lucanid larvae show various food preferences in woody materials (Figure 1). On the other hand, the larvae have also various body shapes especially in abdominal part correlating with the morphology of digestive tract inside (Figure 2).

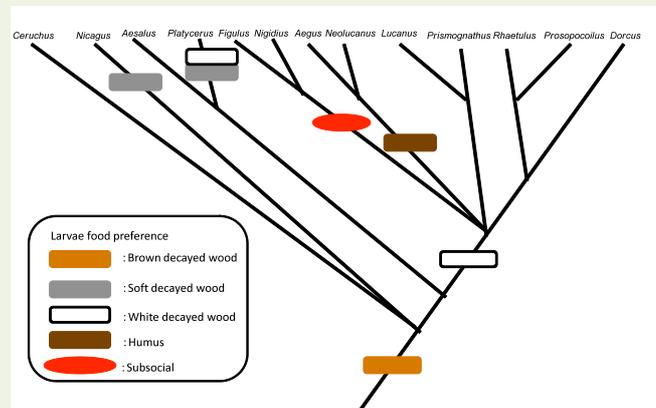


Fig. 1 Phylogeny of Japanese stag beetles and the evolution of larval food preference (after Araya, 2005).

In order to reveal evolution of food preference and morphology of digestive tract in lucanid larvae, I compare morphology of digestive tract parts such as midgut and hindgut, digestive enzyme systems for woody polysaccharides and nitrogen fixation using larvae collected from various diet habitats in the field.



Fig. 2 Different shape of lucanid larvae, particularly in abdomen. Left: *Dorcus hopei binodulosus* inhabiting decayed wood in the early stage, Right: *Odontolabis dalmanni dalmanni* inhabiting humus like woody materials.

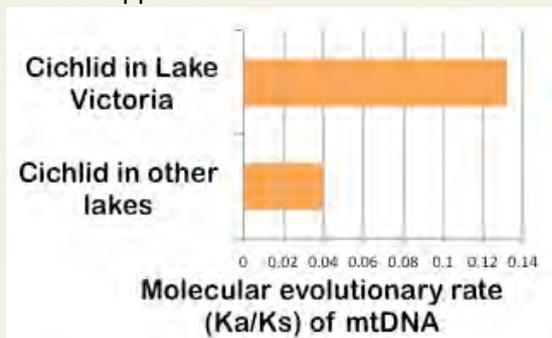
Name: Kazumasa Shirai

Affiliation: Graduate School of System of Life Sciences, Kyushu University

“Evolutionary rates in the Cichlid Fishes of the Three Great Lakes in East Africa”

Many endemic cichlid species have evolved in Lakes Victoria, Tanganyika and Malawi, and their evolution has been affected by the history of each lake. I estimated molecular evolutionary rates at nuclear and mitochondrial protein coding genes in cichlids of the three lakes using the maximum likelihood method. My research revealed that cichlids in Lake Victoria had significantly higher molecular evolutionary rates than cichlids in the other lakes at mitochondrial loci (Fig).

Now I'm examining the molecular evolution of cichlids in Lake Victoria based on the theoretical approach.



Name: Kenichi Shinozuka

Affiliation: Laboratory of Ecohydrology Kyushu University Forest

“The effects of atmospheric nitrogen deposition on the nitrogen cycle in the areas around the Hakata basin”

In my master's thesis, I evaluated the influence of nitrogen load of the paddy field on a small river in the Noto Peninsula. I found the nitrogen concentration of the river was higher in the agricultural off-season than that in the on-season. My result also suggested that the nitrogen input in the upper river basin is important as well as the



influence of a dam located upstream and should be evaluated. The nitrogen concentration of rainfall rises in winter on the Sea of Japan side, and the highly concentrated nitrogen transported from the continent seems as an important source. Usually, the forests act as a sink of nitrogen. However, well developed forest canopy has quite larger surface area, e.g. $8-16\text{m}^2/\text{m}^2$, in comparison with other land cover and is expected to capture atmospheric deposition efficiently. With the increase of atmospheric nitrogen deposition, the role of forest in the nitrogen cycle might be change from sink to source. Previous research suggested that the nitrogen retention capacity of the old plantation is decreasing and the nitrogen load from the forest areas is increasing. So I plan to evaluate the effects of atmospheric nitrogen deposition on the Tataro River. In order to identify the source of nitrogen, various isotope analyses will be applied.

**Seminar Report:
9th GCOE International Seminar, 10 April, 2012**

Lina Kawaguchi

We invited Dr. Margaret Mayfield (The University of Queensland, Australia) for the first GCOE International Seminar in this 2012/2013 academic term. Dr. Mayfield gave a talk entitled “How land

use change impacts species and functional diversity: lessons from Australian and Pacific island plant communities". She presented a conceptual model of how species and functional diversity are expected to respond to land use change and empirical results from plant communities in Australia and the Solomon Islands. Then she discussed the role of species composition, abiotic factors and biogeography in driving patterns of diversity in novel communities and the types of communities likely (and unlikely) to recover unassisted following major land use change. Her researches would have important implications for setting conservation priorities and for deciding whether active restoration is needed for a degraded system.

In the afternoon session of this seminar, GCOE staffs introduced our research activities in each core site: "Harmonizing development with conservation: A challenge of Kyushu University in a new campus" (Dr. Tetsukazu Yahara), "Plant species richness, phylogenetic diversity and functional diversity of Yakushima island" (Dr. Yusuke Onoda), "Evaluation of biodiversity in Cambodia" (Dr. Hironori Toyama), "Land use change and freshwater fish diversity in East and Southeast Asia" (Dr. Yuichi Kano). We also had one more speaker: Dr. Akira Mori from Yokohama National University. Dr. Mori introduced his work on beta diversity in Shiretoko peninsula, Hokkaido.

Approximately 25 people, including SRAs of GCOE program, attended this seminar. Speakers and audiences had fruitful discussions for all topics.

Other Recent Activities

■ Field course

● Cambodia field trip

Dr. Tsuyoshi Kajisa organized a field trip in Cambodia from 7 to 23 May 2012. Trainees were Mr. Tatsuya Mishima, Mr. Keniichi Shinozuka, Mr. Kazuki Tagawa, and Mr. Meng Zhang. Other attendees were Dr. Tetsukazu Yahara, Dr. Fumiko Iwanaga, Dr. Shingo Hosoishi, Dr. Shuichiro Tagane, Dr. Hironori Toyama, Dr. Tsuyoshi Kajisa (Kyushu Univ.), Dr. Hidetoshi Nagamasu and Dr. Ryo Tsujino (Kyoto Univ.).

● Yakushima field trip

Dr. Yusuke Onoda and Dr. Shingo Hosoishi organized a field course in Yakushima from 22 to 27 May.

■ Symposium, Meeting & Seminar

- Dr. Tetsukazu Yahara had an introduction presentation: "Kyushu University projects for biodiversity conservation and sustainable forestry in Cambodia" at a stakeholder meeting on hydrology and water resource (http://aqua.t.u-tokyo.ac.jp/REEL/project/safe/SAFE_20110607.pdf) on 4th May. Dr. Tetsukazu Yahara, Dr. Fumiko Iwanaga and Dr. Tsuyoshi Kajisa visited GCOE experimental plots in Kg. Chhnang province to introduce our activities to Dr. Toshio Koike's research group (Tokyo Univ.), and their study site in Pursat, Battambang, Siem Reap province to know the overview of their researches related to meteo-hydrological measurements.

■ Publications

- Ng WL & Chan HT (2012) Further observations on a natural *Rhizophora* hybrid population in Malaysia. ISME/GLOMIS Electronic Journal 10(1): 1-3
- Ng WL & Chan HT (2012) Survey of *Rhizophora stylosa* populations in Peninsular Malaysia. ISME/GLOMIS Electronic Journal

10(2): 4-6

- Murakami-Sugihara N, Furota T & Okamoto K (2012) Genetic structure of the exotic hard clam *Mercenaria mercenaria* in Tokyo Bay, determined using mitochondrial DNA. Fisheries Science 78(3): 569-575
- Kaifu K, Miyazaki S, Aoyama J & Tsukamoto K (in press) Diet of Japanese eels *Anguilla japonica* in the Kojima Bay-Asahi River system, Japan. Environmental Biology of Fishes *This study got mentioned on NHK's program and Osaka edition of Asahi Shimbun.
- 小島秀彰・海部健三・横内一樹・須藤竜介・吉田丈人・塚本勝巳・鷺谷いづみ (In press) 「福井県三方五湖ー早瀬川水系におけるニホンウナギ *Anguilla japonica* 生息状況の歴史的変遷について」動物考古学

■ Others

- Dr. Kazumi Tsukamoto gave his talk as one of the six keynote speakers at The 6th World Fisheries Congress (7-11 May 2012, Edinburgh, UK).
- Dr. Kenzo Kaifu won the joint second prize of early career poster award at The 6th World Fisheries Congress (7-11 May 2012, Edinburgh, UK). The title of his poster presentation was "Historical changes of Japanese eel distribution in Japan revealed by multidisciplinary approach" (authors: Kaifu K, Miyazaki S, Aoyama J & Tsukamoto K).
- Dr. Yukihiro Shimatani and Dr. Yuichi Kano visited China from 18 to 28 April 2012. They had a meeting with the local government and conducted taxonomic surveys on fresh water fishes (*Acheilognathus* and *Rhinogobius*).

Upcoming Events

■ Symposium, Meeting & Seminar

- Dr. Tetsukazu Yahara and Dr. Makiko Mimura will attend DIVERSITAS bioGENESIS scientific committee meeting (15-18 June 2012, Bonito, Brazil)

Edited by Shin Nishida & Lina Kawaguchi