

## Field Science Course in Yakushima and Genome Science Course

### Outline

“Field Science Course” aims to train students to do fieldwork on the UNESCO World Natural Heritage Site on Yakushima Island, Japan. Young scientists from abroad and graduate students in Kyoto University take part in the course together, using English as an official language.

“Genome Science Course” aims to train students to analyze genomes using up-to-date molecular biological techniques, including next-generation sequencing. In this course, various samples collected in “Field Science Course” will be analyzed. Through the two courses, students will experience the whole process of scientific research, sampling in the field, analyzing in the laboratory, data analysis and presentation of the results.

Experience of field work and genome experiments is not required in this course and we welcome both students who engage in fieldwork and those who engage in laboratory works. Fluency of English is not required in this course. We welcome students who have few chances to communicate in English. Please try to talk with foreign students of the same generation.

In the Field Science Course, students will learn the fundamental methods to study the ecology and behavior of various wild animals. We stay in a small village, having local food. We welcome students who are interested in the nature of Yakushima, and culture of Japan.



## 1. Field Science Course

### Participants

9 students who learn biology from India, Malaysia, Brazil and Tanzania.

15 graduate students of Biological Science, Kyoto University

11 teaching staff, including professors, post-doc and graduate students who study in Yakushima and/or subject species

### Schedule

We will have guidance for the course before you go to Yakushima.

May 18 Leave Kyoto University (around 2:30 a.m.). Stay overnight on the ferry.

May 19 Arrive at Kagoshima. Take ferry to Yakushima. Field Science Course starts.  
Guidance at night.

May 20-23 Fieldwork in Yakushima

May 24 Data analysis, presentation in the afternoon

May 25 Leave Yakushima by ferry. Stay overnight on the ferry.

May 26 Arrive at Kyoto University (around 9 a.m.)

### Courses

We have four courses, monkey, insects, plants and deer (and other mammals') feces. Please choose your first to fourth preference of the course. Please note that we can not ensure your first preference, due to capacity of the courses.

#### A) Monkey course

Yakushima monkeys or Yakushima macaques (*Macaca fuscata yakui*) is a subspecies of Japanese monkeys (*Macaca fuscata fuscata*) endemic to Yakushima Island. Monkeys in the western coastal area on the island have been studied since 1975. They are well habituated to human, individually identified, and can be observed closely. However, it may be difficult for beginners to follow them in the steep mountains. Please try to follow monkeys, navigating in the mountainous forest by a compass and a map with lectures.

We will observe foraging behavior of monkeys to estimate their diet by direct observation. We also collect foods remained by the monkeys and their feces of monkeys and estimate their diet and genetic variation from feces. If possible, we will collect feces from identified individuals. To do this, you need to identify monkeys, follow them and watch the moment they drop. We also observe foraging behavior of monkeys to estimate their diet by direct observation. When they are not foraging, you can observe social behavior such as grooming.

#### B) Insect course

We will collect insects as potential foods of Japanese monkeys and determine their DNA sequences for DNA bar-coding. In the last Field Science Course, we tried to identify insect species contained

in feces of Japanese monkeys by DNA bar-coding. Unfortunately, however, we found that DNA sequences of insects are too short to determine the insect species in the feces. Therefore, we accumulate DNA data of insects and make DNA database of insects in Yakushima Island in the long term.

### **C) Plant course**

Yakushima Island has the highest peak in Kyushu area, Mt Miyanoura-dake (1963m ASL). This steep gradient from the sea to the over 1900, produces diversity of plant species. This island has heavy rain fall, ranging 4000-8000 mm per year, and produces rich fern species.

In the plant course, we study diversity of fern and its basic data. For this purpose, we will identify ferns morphologically, both in the spore forming and vegetative growth stages, in the several sites on the island. We also collect samples for DNA bar-coding, which will enable us determine species of ferns, which are difficult to determine morphologically and those in the vegetative growth stage. These data will also provide a reference for foraging of ferns by mammals.

### **D) Deer (and other mammals') feces course**

Weasels in Yakushima have not been studied well and their information is quite limited. In this course, we try to increase basic information of weasels on the island. We search feces of weasels in the forest and estimate their diet and genetic variation from feces. Direct observation of weasels is difficult and we set some automatic camera to record weasels.

We opportunistically observe monkeys and deer while we searching feces of weasel.

## **2. Genome Science Course**

Soon after the Field Science Course, we will have Genome Science Course, using samples collected in the Field Science Course in Yakushima Island. We will analyze DNA of host animals, that of foods, and intestinal micro-biota from fecal samples, using next-generation sequencers and other apparatus. We will also lecture on the analysis of next-generation sequencing.

### **Schedule**

We will have guidance for the course before you go to Yakushima.

May 25 – June 6

### **Place**

Department of biology, Faculty of Science, Kyoto University

### **Courses**

Target re-sequencing of genome of Japanese monkeys from their feces, collected in Yakushima Island.

Survey of micro-biota in the intestine of Japanese monkeys by next-generation sequencing.

Identify insects species predated by monkeys by next-generation sequencing of their feces.

Determine DNA sequence of insects collected in Yakushima Island for DNA bar-coding.

Determine DNA sequence of ferns collected in Yakushima Island for DNA bar-coding.

### **Lectures**

Kiyokazu AGATA (Dept. Biophysics, Kyoto Univ.)

Takushi KISHIDA (Dept. Biophysics, Kyoto Univ.)

Takushi HAYAKAWA (Primate Res. Inst., Kyoto Univ.)

Sören Franzenburg (Kiel University)

Akiko SAWADA (Primate Res. Inst., Kyoto Univ.)

Teiji SOTA (Dept. Zoology, Kyoto Univ.)

Shizuka FUSE (Dept. Botany, Kyoto Univ.)

### **International Seminar**

Date: June 6 (Fri), 2014

Place: Science Seminar House, Kyoto University.

We will have talks of visiting foreign students and host researchers. We will also present the results of Field Science Course and Genome Science Course.

### **Accommodation and meals**

In Yakushima, students stay in the field station of Kyoto University. At dinner, you can enjoy the local Yakushima foods, which are cooked by local Yakushima people. You can also try hot springs which are used as public bath, but private bathrooms are also available.

### **Fee**

14000-20000 Yen, for meal, insurance, etc. for the stay in Yakushima.

In addition to this cost, participants need to pay for the cost of meals during your trip between Kyoto and Yakushima.

### **Reports on the past program**

Global COE website (in English)

<http://gcoe.biol.sci.kyoto-u.ac.jp/gcoe/>

Field Science Course 2010, including reports (in English)

[http://gcoe.biol.sci.kyoto-u.ac.jp/gcoe/eng/report/2011/01/report\\_of\\_fieldworkgenome\\_trai.php](http://gcoe.biol.sci.kyoto-u.ac.jp/gcoe/eng/report/2011/01/report_of_fieldworkgenome_trai.php)

(June 3-7. Genome Science Course at Kyoto University)

(June 10 Attend international seminar and present the results)



Group photo of the participants of the Field Science Course in 2008, 2009 and 2010.





Dinner at Yakushima

