

## Advanced training and Advanced laboratory skills in field biology in 2019

### 1.1 Outline

“Advanced training in field biology” (field 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 attend the course together, using English as an official language.

“Advanced laboratory skills in field biology” (laboratory course) aims to train students various laboratory skills to study wildlife, including hormonal and genetic analysis, from rudimentary DNA sequencing techniques to the analyses of high-throughput next-generation sequencer data. In this course, various samples collected in the preceding field course will be analyzed. Students can choose a topic which is suitable for their interest and prior experience in molecular biological experiments. Through the two courses, students will experience the whole process of scientific research, sampling in the field, analyzing in the laboratory, conducting data analysis and presentation of the results.

No previous experience is required to take these courses and we welcome both students who engage in fieldwork and those who engage in laboratory work. We also welcome students who have few chances to communicate in English. Please communicate with foreign students of the same generation.

In the field 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 hope you enjoy the nature and culture of Yakushima Island.



## 1.2 Application

A graduate student of Biological Science, Graduate School of Science, Kyoto University (as of April 2019) can apply for the courses. Please note that we accept a limited number of participants due to safety for fieldwork and limited capacity of accommodation and transportation.

We will hold the course twice this year, in spring and fall. The contents of spring and fall courses are different, and students may take only one of them. If an applicant was unaccepted for the spring course, he/she may apply again for the fall course.

In both seasons, the field course will be held in Yakushima Island. We hold the laboratory course at Yoshida Campus of Kyoto University in Kyoto City, or Center for Ecological Research, in Otsu City, or at the Primate Research Institute in Inuyama City (depends on the group).

Students may apply to either the two courses, though we encourage to take both of them.

Application form is available at the following site

<http://www.wildlife-science.org/ja/curriculum/yakushima-field-science-course.html>

<http://www.wildlife-science.org/en/curriculum/yakushima-field-science-course.html>

## 1.3 Fee

Please pay 15,000-20,000 yen for meals and insurance, on the first day in Yakushima. This will pay you back from the university later. During the field course in Yakushima, please pay by yourself the cost of meals other than those provided in our field station (usually, lunch on the first day, lunch and dinner on the last day), optional activities such as entrance fee of sightseeing sites, public bath and snacks.

## 2. Schedule

### **Advanced training and Advanced laboratory skills in field biology in spring**

April 19      Deadline for application by students of Kyoto University (both courses)

May 23, 3:00 p.m.      Guidance and lecture at WRC in Yoshida Campus. PRI students can join it by teleconference. We will have a welcome party for participants from abroad.

### Field course (Yakushima Island, Kagoshima Prefecture)

May 25      Field course\_starts (Move to Yakushima on this date)

May 26-29      Fieldwork in Yakushima

May 30      Data analysis, presentation in the afternoon

May 31      Leave Yakushima

Laboratory course at Kyoto University (Yoshida Campus, Kyoto City or Center for Ecological Research, Otsu City)

- June 3 – 7 Experiments and analyses, at several laboratories.  
 June 10 Preparation for presentation (both for “Advanced training in field biology”)  
 June 11 Presentation of the results of the courses at international workshop (held at Yoshida Campus)

### **Advanced training and Advanced laboratory skills in field biology in fall**

The contents and schedule of the courses in fall is not fixed. We will announce them at the following web site, in July, 2019.

- Oct. 9 Deadline for application by students of Kyoto University

#### Field course (Yakushima Island, Kagoshima Prefecture)

- Nov. 16 Field course\_starts (Move to Yakushima on this date)  
 Nov. 17-20 Fieldwork in Yakushima  
 Nov. 21 Data analysis, presentation in the afternoon  
 Nov. 22 Leave Yakushima

#### Laboratory course at Kyoto University (Yoshida Campus, Kyoto City and / or Primate Research Institute, Inuyama City)

- Nov 25-29 Experiments and analyses, at several laboratories.  
 Dec. 3 Presentation of the results of the courses at international workshop (held at Yoshida Campus)

<http://www.wildlife-science.org/ja/curriculum/>

### 3. Field course (Advanced training in field biology) in Spring (May 25-31)

#### 3.1 Participants

About 18 graduate students

About 7 teaching staff, including professors, post-doc and graduate students who study in Yakushima and/or subject species.

#### 3.2 Groups

In this year, we will study two different topics. The students are requested to indicate the group they wish to join in the application form, but all the students will join in the data collection of both of the topics in Yakushima. Students are divided into the two groups when they prepare oral presentations in Yakushima, poster presentations in Kyoto and write a report of the topic.

**A) Fly group**Title

Coprophagous fly assembly in the mammal feces: Implications for iDNA studies

哺乳類の糞に集まるハエ群集: iDNA 研究に関連して

Lecturers

Goro HANYA (Primate Research Institute, Kyoto Univ.) 半谷吾郎(京都大・霊長研)

Akiko SAWADA (Chubu Univ.) 澤田晶子(中部大)

Takeaki HONDA (Primate Research Institute, Kyoto Univ.) 本田剛章(京都大・霊長研)

Wanyi LEE (Primate Research Institute, Kyoto Univ.) リーワンイ(京都大・霊長研)

He Tianmeng (Primate Research Institute, Kyoto Univ.) ヘティアンモン(京都大・霊長研)

Abstract

Recently, genetic samples collected from coprophagous (dung-eating) or haematophagous (blood-eating) invertebrate are called iDNA and regarded as a potential source of mammal genetic information. However, data from iDNA may be biased in an unknown manner, which would be affected by feeding preferences of these animals. In this group, we follow wild Japanese macaques and sika deer, and collected their fresh feces. Then we will observe the feces and record the number and species of flies which are attracted. We compare the coprophagous fly assembly between monkey and deer feces.

**B) Species Interaction Group**Title

Complex webs of interspecific interactions in ecosystems

謎に満ちた生物間相互作用ネットワークを解明する

Lecturers

Hirokazu TOJU 東樹宏和 (京都大・生態研)

Sayaka SUZUKI 鈴木 紗也華 (京都大・生態研)

Hiroaki FUJITA 藤田 博昭 (京都大・生態研)

Abstract

No animal/plant individual lives alone. In other words, fitness of macro-organisms depends greatly on other individuals or species. Understanding dynamics of interspecific interactions is one of the major challenges in biology. Nonetheless, we have just started to develop ways to reveal the structure of complex webs of interspecific interactions in nature. In the “Species Interaction Group”, we will try to reveal “unobservable” interactions among species. By sampling plant tissue and isolating symbiotic fungi, for example, we will be able to understand the architecture of networks involving multiple plant species and fungal morpho-species. Moreover, participants of the “Advanced laboratory skills in field biology” will be able to

uncover the structure of spider–prey foodwebs or symbiont–symbiont networks within plant/animal bodies by means of DNA metabarcoding (Illumina sequencing).

#### 4. Advanced laboratory skills in field biology in spring (June 3- June 11)

Following the field course”, laboratory course of will be held. If you are planning to take both the courses, we will be using the samples collected during the field course in Yakushima Island for the laboratory course. Therefore, we recommend that you join in a group in laboratory course that corresponds to the one in the field course you took. In spring, the courses will be held either in Kyoto (Monkey group) or Otsu (Species Interaction group).

##### Recommended combinations

Laboratory Course	Field Course
A) Monkey genotypeing group or B) Monkey phylogeography group	A) Fly
C) Species Interaction	B) Species Interaction

#### **A) Monkey genotyping group: microsatellite genotyping of Yakushima macaques**

##### Lecturer

Miho MURAYAMA (Wildlife Research Center, Kyoto Univ.) 村山美穂 (京都大・野生動物)

##### Abstract

Using feces collected in the Field Science Course we extract DNA and conduct sex identification. Then we genotype microsatellite loci for individual identification and kinship estimation. The result will be comparable with the result of Monkey 2.

#### **B) Monkey phylogeography group: phylogeography of Yakushima macaques**

##### Lecturer

Takushi KISHIDA (Wildlife Research Center, Kyoto Univ.) 岸田拓士 (京都大・野生動物)

##### Abstract

Using feces collected during the Field Science Course, the phylogeography of Yakushima macaques will be investigated based on the mitochondrial DNA (mtDNA). The mtDNA-based phylogeography of the Yakushima macaques was primarily reported by Hayaishi and Kawamoto in 2006. They found 6 haplotypes of the mtDNA among Yakushima macaques and reported the distribution of these haplotypes. We will investigate the current distribution of these haplotypes. This may reflect the movement of Yakushima macaque population during the last decade.

## C) Species Interaction Group

### Title

Complex webs of interspecific interactions in ecosystems

謎に満ちた生物間相互作用ネットワークを解明する

### Lecturers

Hirokazu TOJU 東樹宏和 (京都大・生態研)

Sayaka SUZUKI 鈴木 紗也華 (京都大・生態研)

Hiroaki FUJITA 藤田 博昭 (京都大・生態研)

### Abstract

By applying high-throughput DNA metabarcoding to organismal samples collected on Yakushima, participants will be able to uncover the structure of 1) below-ground plant–fungal networks, 2) spider–prey foodwebs or symbiont–symbiont networks within plant/animal bodies. Participants are expected to have basic molecular biology techniques (micropipetting, PCR, etc.).

## **International Seminar**

Date: June 11 (Tue), 2019

## 5. Information on fieldwork and life in Yakushima Island

### 5.1. Fieldwork

#### **Research in Yakushima**

In the forest, the canopy is closed and the forest floor is dark. Undergrowth is sparse in the western lowland where you can observe habituated Japanese macaques and deer. There are no trails in the western lowland forest, but we can walk through most parts easily. We sometimes walk on steep slope and cross streams. In other parts of Yakushima, we walk only along logging roads or existing trails for hikers. Please wear long trousers and shoes to protect your legs and feet in case you lose your balance.

During the month of May, you may get bug bites (mostly mosquitoes). A long-sleeved shirt is good for protection from insect bites. Wear a long-sleeved shirt, if you have sensitive skin. We also walk on the road to search for animals and their feces. Sunlight is strong on the road so you may need a hat.

In the forest, visibility is poor and you need to confirm your location using a map and compass.

#### **Weather**

Air temperature is about 18-26 °C in May and 19-25 °C in October in lowland.

Yakushima Island is famous for rainy climate. Early June is the beginning of rainy season and it is likely to rain in late May.

### **What to wear on the field**

- Long-sleeved shirt, long trousers, hat or cap

In general, it is better to wear a long-sleeved shirt and long trousers to cover your skin on the field. They will protect you from insect bites, scratches and strong sunlight. Sunlight is very strong in May. Long trousers should be soft and loose enough to walk on steep slopes. Avoid tight jeans, because they become heavy and hard when they are wet.

- Shoes

Avoid slippery shoes or those that do not cover your foot, such as sandals.

Mountaineering shoes are the best, if you have. We recommend them, if you do not have enough experience in walking in hilly forests.

Jogging shoes or sneakers are good in lowland forest, though they are not water proof. They should be tough enough to walk on the rocky slope.

If you have old mountaineering shoes, jogging shoes or sneakers (more than 3 years), check their soles. Old bond may become weak and the soles can fall apart. Almost every year, one or two participants have had their soles fall apart.

Long boots are also good, if you are experienced in walking in the mountain with them.

If you do not have suitable shoes, you can borrow trekking shoes from a sport shop in Yakushima and you do not have to pay the rental fee by yourself.

- Rainwear

Good rainwear is essential for the fieldwork in Yakushima. Waterproof and breathable one (Gore-Tex) is highly recommended. You can do not have your own, you can borrow from a sport shop in Yakushima and you do not have to pay the rental fee by yourself.

- Gloves

You may wear gloves if you like. Thin gloves are good for manipulation, such as taking notes.

## **5.2. Accommodation and meals**

In Yakushima, we stay in the field station (PWS House Yakushima) of Kyoto University in Nagata Village. All meals are provided during our stay in the field station. For dinner, you can enjoy local foods cooked by local people. Students and staffs will not cook except for the BBQ on the last night. We wash dishes and clothes and clean the rooms by ourselves.

### **Do it yourself in the field station**

We have no housekeeper in the station. You will be responsible for maintaining the station and doing daily chores such as cleaning, washing clothes, packing lunch, washing dishes,

taking out the garbage, etc. Please do these things actively and cooperatively.

### **Meals**

Meals are cooked by residents in Yakushima. Please help them cook when necessary. If you have food allergy or food(s) to avoid (e.g., meat for vegetarian), please let us know.

We pack lunch by ourselves. Bring a lunchbox of your preference and utensils necessary (spoon, fork, chopsticks, etc.).

### **Room and bedding**

In the Field Station, there is a dining hall, kitchen, 3 shower rooms and 3 restrooms. You will share one of the 5 bedrooms with other students (4 people/room). Each bedroom has two bunk beds with mattresses. Please bring your own sleeping bag and/or warm clothes, as the temperature may drop to 15 degrees at night. Expensive, high-quality sleeping bag is not necessary as we stay inside the house at night.

### **Bath**

There are three shower rooms. We prepare shampoo and soap, which you can use freely for bathing. If you prefer your own shampoo or soap, please bring them. Have your own towel for bathing.

As it takes a long time for everyone to take a shower, some of us may go to public bath. You can try Japanese public bath, if you like. When you go to a public bath, have soap and a towel with you.

### **Washing clothes**

Two washing machines are available. We will provide the laundry detergent. Please wash your clothes together with those of other station members, to save time. We prepare mesh bags for washing, for which you can put your clothes in. Do not start washing after 10 p.m., to avoid making noise and inconveniencing others.

### **Others**

You may bring sandals, which may be useful for walking around the station.

### **Shopping**

In Nagata Village, you can buy snacks, drinks and daily necessities at a small shop. There are no supermarkets or convenience stores in the village. There is a supermarket in Miyanoura (20 km from the field station), the largest town in Yakushima Island, but you may not have time to go shopping there, except on the first and last day. You will have some time for shopping, on the last day.



## 5.2. List of personal equipment

### **Equipment for field research (common to all groups)**

In addition to below, some other equipment will be necessary depending on your activity. Special equipment in each group will be announced later.

- small backpack
- notebook (pocket size is good)
- pen / pencil
- marker (with which you can write on plastic sample bags and plastic tubes)
- canteen (you may use a PET bottle)
- lunch box and spoon, fork, chopstick (bring a plastic container to pack your lunch to Yakushima)
- flashlight (and batteries)
- sampling bag, tube, etc. (they are given to participants at Yakushima)
- maps (they are given to participants at Yakushima or Kyoto)
- poison remover (they are given to participants at Yakushima)
- backpack cover, or plastic bag inside the backpack (optional, when it is rainy)
  
- long trousers (and a belt, must)
- socks (must)
- rainwear / umbrella (when it is rainy)
  
- whistle (optional)
- insect repellent (optional)
- antipruritic (optional)
- sunscreen (optional)
- snack, candy, etc. (optional)
- adhesive tape (optional, each lecturer has a first-aid kit)
- towel (optional)
- tissue paper (optional)
  
- vest (optional)
- waist pouch (optional)
- spats (optional)
- gloves (optional)
- camera (optional)

### **Other equipment for stay at the field station**

- sleeping bag (must). We have five sleeping bags to lend. Please ask PWS Leading Graduate Program Office

- underwear
- clothes (which you can wear in the house)
- sandals
- towel
- soap (for public bath)
- toilet kit
- laptop (optional; a personal laptop computer is useful for data analysis and presentation of the results)