

Research Activity Report
Supported by “JSPS Core-to-Core Program(International Core of Excellence for Tropical Biodiversity Conservation focusing on Large Animal Studies)” “Leading Graduate Program in Primatology and Wildlife Science”

(Please be sure to submit this report after the trip that supported by CETbio,PWS.)

2018. 06, 01	
Affiliation/Position	University of Oxford/Research Assistant and future DPhil Student
Name	Megan Beardmore-Herd

1. Country/location of visit
Yakushima, Japan
2. Research project
Study on Species Composition of Bryophytes and Fern Sporophytes and Gametophytes in Yakushima, Japan
3. Date (departing from/returning to Japan)
2018. 05. 19 – 2018. 05. 25 (6 days)
4. Main host researcher and affiliation
Dr. Hiroshi Kudoh (Kyoto University) and Dr. Wataru Shinohara (Kagawa University)
5. Progress and results of your research/activity
<p>During this visit, I was a member of the Plant Team. We conducted research on ferns in Yakushima and the bryophyte species which live on them. Our main research questions were:</p> <ul style="list-style-type: none"> • Does species composition of fern gametophytes differ by altitudes within Yakushima? • Are there any new species of fern in Yakushima? • Are there any bryophyte species living on the fern leaves in Yakushima? • What environment do the bryophytes prefer? • Is there any host-selectivity by bryophytes for particular ferns? <p>From the PWS field station in Nagata village, we travelled to four different sampling sites of varying altitudes and environmental conditions: 1 – Onoaida Trail (161 m), 2 – Onoaida Trail (~350 m), 3 – Yodogo Trail (~1300 m), 4 – Menko (185 m). To get to the sampling sites we had to do lots of trekking, sometimes close to the edges of rivers and up rocky inclines. At the sampling sites we attempted to find and collect fern gametophytes, sporophytes, and sporophytes with suspected bryophytes living on them.</p> <p>At the end of each day we would return to the field station to separate and organise our samples. Individual sporophytes were kept in newspaper to allow them to dry out and better preserve. We identified the species of each sporophyte collected using Iwatsuki’s classification (Iwatsuki, K. 1992. <i>Ferns and fern allies of Japan</i>. Heinbonsha. Tokyo. Pp. 311). We collected 53 sporophyte samples across the four sites, corresponding to 35 species. The number of species was highest at site 4 (n=18) and 1 (n=15) and lowest at site 3 (n=6). 12 species were found in two or more sites, but <i>Hymenophyllum barbatum</i> was the only species collected from three sites (2, 3 and 4). We suspected that the high sporophyte species diversity of site 1 and 4 may have been a consequence of two environmental factors: 1) the lower altitude of these sites and their resulting higher temperatures, and 2) their close proximity to a river.</p> <p>We collected 185 potential gametophyte samples in total – 50 from Site 1; 71 from Site 2; 16 from Site 3; 48 from Site 4. Back at the field station, we cleaned the gametophyte samples carefully using fresh water, before splitting each sample in two and storing in tubes containing 80% ethanol. One half of the sample was kept as a voucher specimen, whilst the other half was taken back to Kyoto University where DNA analysis and barcoding would be conducted as part of the Genome Science Course in order to identify the fern species the gametophytes belonged to. Whilst separating our gametophyte samples at the field station we had a preliminary look at them under a microscope. We suspected that we may have found several cordiform gametophytes and maybe even a few strap-shaped and filamentous forms, though laboratory work would be needed to confirm this.</p> <p>43 bryophyte samples living on fern sporophytes were collected. For each sample, the host fern species was identified,</p>

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and the bryophyte species estimated using stereomicroscopes. We discovered at least two different bryophytes (*Cololejeunea spinosa* and one other unidentified) on two fern species (*Arachniodes sporadosora* and *Hymenophyllum polyanthos*). Laboratory work will be conducted on the samples as part of the Genome Science Course at Kyoto University in order to investigate further.

At the end of the field course, we presented our work to the other teams and researchers. It was a great opportunity to practice group work, develop our presentation skills, and hear about the work of the other groups.

The Yakushima field course was a hugely rewarding experience. Not only did I learn important fieldwork techniques which will help with my future research, I also used this opportunity to meet other researchers from around the world and learn about their work. Additionally, since I am from the UK, the course allowed me to experience Japanese culture for the first time and try some delicious Japanese food. Being in the beautiful setting of Yakushima was also very rewarding and, despite being in the plant team, we still managed to observe numerous macaques and deer on our journeys to and from the sampling sites.

I am currently collaborating with the other plant team members on a report which will combine the results of the Yakushima Field Course and the Genome Science Course.



Plant team, Spring 2018

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Trekking to one of the sampling sites



Collecting gametophyte



Japanese macaques spotted on the drive to the first sampling site



Deer spotted on the drive to the first sampling site

6. Others

I would like to express my gratitude to Dr. Hiroshi Kudoh and Dr. Wataru Shinohara for leading the plant team and offering their guidance and support, as well as my fellow plant team members for their hard work and persistence through rain and shine. I would also like to thank the other researchers at the PWS field station for all of their assistance leading up to and during the field course, particularly Prof. Goro Hanya. Finally, I would like to thank PWS and CET-Bio for organising my attendance of the field course and financially supporting my trip to Japan.

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