（海外・国内）出張報告書（学生用）　　2014 年 10 月 14 日 提出

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所属	Toxicology
学年	DC1
出張先	South Africa
出張期間	28th September – 13th October 2014
目的	Field sampling trip

活動内容（2,000 字程度、活動内容が判る様な写真や図表を加えて下さい）

I travelled from Sapporo to Johannesburg with Ikenaka Sensei, leaving on 28th September & arriving on 29th. We then drove to Ndumo Game Reserve in the KwaZulu-Natal region where our collaborators from the University of Johannesburg & North West University had sent up camp. Halfway through the trip we moved to a lodge in Shemula which was closer to our sampling area. KwaZulu-Natal is in the northeast of South Africa, bordering Mozambique, & is an area with a risk of malaria. As such, various pesticides including the organochlorine chemical DDT are utilized in indoor residual spraying (IRS) programs to control mosquitoes which are the vector for malaria.

The focus of my PhD is on the effect of vector-control chemicals on the health of animals & people. We collected samples for my research between 30th September & 8th October. At the start of the period, we visited the Health Office in Jozini to obtain information regarding IRS Health Camps, which are the major enforcers of the vector-control program against malaria in the region. Importantly, we obtained information about the amount of pesticides used in our study area over the previous few years, including the number of rooms where IRS was applied. We also had to visit the local Agricultural Office to obtain a health certificate from the local veterinary officer for the birds sampled, necessary to import samples to Japan.

Based on the information from the Health Office & further assistance from their staff in local camps, we were able to perform a systematic collection of samples

across several areas in the KwaZulu-Natal region between Jozini & Ndumo. We purchased chickens & eggs from local residents in the following areas: Ndumo, Makanis, Mzondi, Othobothini & Mawfene. Chickens were selected as the focal species as they live in close habitation with humans in the environment where IRS is used, are relatively cheap & are readily accessible for sample collection. Other animal species in the region include goats & cattle, but it is difficult to obtain large numbers of samples from these. Also, avian species appear to be more susceptible to the toxic effects of organochlorines than mammals.

Although we anticipated collecting samples from approximately 30 chickens, we were successful in collecting more than 50. These included a small number of shop-bought (i.e. intensive farm-reared rather than free-range) chickens & eggs to be used as controls. Chickens were dissected after slaughter & multiple tissue samples collected for organochlorine content analysis at the toxicology laboratory in Sapporo. Egg contents were also collected for similar analysis. After preparation, eggshell thicknesses were measured on site – previous studies have reported that DDT metabolites affect egg production in various bird species, often by causing eggshell thinning (although chickens appear to be more resistant to DDTs than other avian species). Samples collected were stored in freezers – initially in those provided by the University of Johannesburg base camp & then at our lodge in Shemula. On returning to Johannesburg, samples were stored in the freezer at the University of Johannesburg before transport back to Japan. During transportation from Johannesburg to Sapporo, the samples were triple-bagged in cool boxes along with freezer packs to reduce defrosting, before storage in the toxicology laboratory freezer room at Hokkaido University.

As we had excellent local interpreters, I was able to perform a short questionnaire with the owners of the chickens. This valuable information will enable me to better ascertain the health risk to people from the chickens, once I have the results from analysis of organochlorine pesticide levels in the samples obtained. This interview also gave us a chance to explain our research theme well, for the local people to ask questions about our work, & for me to gain an insight into the day-to-day lives of the people in the region. I am very grateful to our local interpreters in KwaZulu-Natal, Samwel & Nelson, without whom I would not

have been interview the local residents from whom we obtained samples.

During the stay at Ndumo Game Reserve, I was able to discuss various research topics with the students from the University of Johannesburg & visiting students from Belgium. These students are focusing on aquatic ecology in Ndumo, but their work is interesting as the pesticides used in malaria control also affect the aquatic environment so our research topics are complimentary. The Ndumo Game Reserve is internationally known as a site of over 400 species of wild birds – the highest number in South Africa. Use of pesticides such as DDT have been shown to detrimentally affect wild birds so it is important to monitor use of pesticides in such ecosystems. My initial work on domesticated poultry in areas adjacent to the game reserve will give us some insight into potential risks to such wild birds (without necessitating capture of rare & protected wild species).

We returned to Johannesburg on 9th October & spent 10th at the University of Johannesburg packing the samples in the manner required by the Japanese import regulations. At the University of Johannesburg I was able to meet again with students who had performed exchanges with Hokudai to conduct analyses in our laboratory over the past six months. We left Johannesburg on 11th & returned to Sapporo on 13th October.

I am delighted with the success of the sampling trip & am indebted to the One Health program for financial support in the form of this travel grant. I look forward to seeing the results of the sample analysis over the coming months.

Fig 1: Collection of eggs for shell thickness measurement & free-ranging chickens for collection of tissues.

Fig 2: Meeting with KwaZulu-Natal Health workers, including the laboratory team who screen blood samples for malarial infection (above) & those who spray pesticides in homes to control mosquitoes which transmit malaria (right).

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