

**Research Activity Report**  
**Supported by “Leading Graduate Program in Primatology and Wildlife Science”**  
 (Please be sure to submit this report after the trip that supported by PWS.)

	2015. 11. 30
<b>Affiliation/Position</b>	Primate Research Institute/D1
<b>Name</b>	Duncan Wilson

<b>1. Country/location of visit</b>
Kyoto University Kumamoto Sanctuary, Japan
<b>2. Research project</b>
Animal Welfare course
<b>3. Date (departing from/returning to Japan)</b>
2015. 11. 24 - 2015. 11. 27 (4 days)
<b>4. Main host researcher and affiliation</b>
Prof. Satoshi Hirata and Assistant Prof. Naruki Morimura (Kyoto University Wildlife Research Center)
<b>5. Progress and results of your research/activity</b> (You can attach extra pages if needed)
Please insert one or more pictures (to be publicly released). Below each picture, please provide a brief description.
<p><b>Aim</b></p> <ol style="list-style-type: none"> <li>1. To learn about the daily lives of the chimpanzees and bonobos at Kumamoto Sanctuary.</li> <li>2. To make an environmental enrichment device which will occupy the apes for the longest time.</li> <li>3. To evaluate the effectiveness of the enrichment device.</li> </ol> <p><b>Day 1 (24<sup>th</sup>):</b> Orientation, sanctuary tour, and enrichment device planning and construction.</p> <p><b>Day 2 (25<sup>th</sup>):</b> Enrichment device construction, observation of chimpanzees and bonobos, box enrichment, and student enrichment devices introduced to bonobos (data recording, analysis and discussion).</p> <p><b>Day 3 (26<sup>th</sup>):</b> Birthday cake and party for bonobos, observation of chimpanzees and bonobos, student enrichment devices introduced to chimps (data recording, analysis and discussion) and presentation prep.</p> <p><b>Day 4 (27<sup>th</sup>):</b> Presentation, feedback, and staff comments about enrichment devices (effectiveness and improvements) followed by free discussion on enrichment and welfare.</p> <p>My Masters Degree was in Applied Animal Behaviour and Animal Welfare and so I was very interested in taking this course. On the first day we learnt about different kinds of environmental enrichment for captive animals (i.e. physical, social, sensory, cognitive and food-based enrichment). The main goals of environmental enrichment are to; increase the range or number of natural behaviour patterns (behavioural diversity), provide mental and physical stimulation, increase animal choice and control, increase utilization of space, increase positive indicators of welfare (e.g. play), decrease indicators of stress (e.g. elevated cortisol), and reduce abnormal behaviours (e.g. stereotypies). We also discussed the importance of evaluating the effectiveness of environmental enrichment in relation to the above goals.</p> <p>In teams (pairs) we discussed several ideas for enrichment devices. As wild chimpanzees spend up to 60% of their waking day searching for and eating food (Goodall, 1986), and assuming that wild bonobos also spend a significant part of their day searching for food, we decided that a food-based enrichment device would work best for both species. I have recently observed wild chimpanzees using sticks to fish for termites at Gombe Stream National Park in Tanzania, and thought of simulating a similar natural behavior in captivity. Although wild bonobos engage in tool use less frequently than chimpanzees (Furuichi et al. 2015) we thought they may have the capacity to use tools in captivity. We eventually settled on the idea of ‘Honey Dippers’ which the apes had to repeatedly dip a stick into to eat honey (Photo 1). We used clear plastic tubes in order to make the honey easily visible, and drilled a small hole in the cap, so that a stick could be inserted (Photo 6). We also drilled holes in the side of the tube in order to attach it securely with wire to the enclosures. Chopsticks and metal sticks were positioned close to the devices or attached nearby with rope to encourage their use. Other teams developed ‘Toy Balls’, which contained plastic toys and food (Photo 2) and ‘Rolling Soy Balls’ (Photo 3) which contained soy seeds inside plastic balls which could be physically manipulated to drop down into a tube for collection. All devices were checked for safety by the staff before use (Photo 4).</p>

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For each team three identical devices were introduced to both the chimpanzee and bonobo enclosures in three different locations (a total of six devices were constructed per team). However, the Rolling Soy Balls team decided to introduce two devices of different designs to each enclosure (a total of four devices). Each team carried out focal event sampling for 60 minutes at each ape enclosure to measure the total amount of time they spent interacting with their devices. 3 female bonobos, and 7 chimpanzees (1 male and 6 females) interacted with our Honey Dipper devices. Out of a maximum 180 minutes (60 minutes interacting with each of the three devices) the chimpanzees spent a total of 40 minutes and the bonobos spent a total of 39 minutes interacting. The chimpanzees may have spent the least time at the centrally located honey dipper because it was at the highest location. The bonobos may have used the device on their right side the most, as it was located close to another team’s enrichment device. Overall, the total time the apes spent interacting with our devices was 79 minutes out of a maximum 360 minutes (around 22% for both species). The Rolling Soy Balls occupied the ape’s time for the longest, followed by the Toy Balls, and lastly the Honey Dippers for the shortest time.

Overall, our enrichment devices were effective in occupying the apes for a considerable amount of time, considering they were in competition with other devices, and fulfilled many of the main goals of environmental enrichment. However, we noted a number of points for improvement which would make our device more effective. The plastic tubes were bitten into by both the chimpanzees and bonobos leading to leakage of honey. Therefore, we would use much stronger plastic, or position the device outside the enclosure to prevent biting (e.g. Photo A). We would also modify the design from a tube to a tray shape, which has a smaller vertical and larger horizontal surface area, thus taking more time to eat all the honey using a stick. In order to allow more apes to access the device at the same time, we would increase its size, add more honey, and allow multiple access points (e.g. Photo B). Finally, the apes did not use the metal sticks provided and so we would only provide chopsticks, or sticks made from natural material.

Feedback from staff members regarding the effectiveness of our device for both species was consistent. The main criticism was that both the chimpanzees and bonobos could easily destroy or remove our device. On the other hand, the honey was attractive, and the devices were easy to make and replace. In addition to the suggestions for improvement mentioned above, one suggestion I particularly liked was to let the apes find and make their own sticks, which would increase the time they spend engaging in natural behaviours.



Photo A. Honey Feeder (Kyoto University)



Photo B. Honey Pot Feeder (youtube.com)

My overall impression about the daily lives of the 56 chimpanzees at Kumamoto Sanctuary was that they live in a relatively small space in quite large numbers. As Kumamoto Sanctuary was a former chimpanzee medical research facility, many of the enclosures were not designed with their physical and mental wellbeing in mind. However, since Kyoto University took over in 2011, supported by Prof. Tetsuro Matsuzawa, many improvements have been made including; the creation of larger enclosure space and social groups, the building of an open air enclosure and tower which different social groups have access to on a rotational basis (Photo 12), and the building of a long outdoor tunnel which the chimpanzees can walk along to see other parts of the facility. The bonobo enclosure was built recently and so it has a relatively large space for 6 individuals. The staff are clearly dedicated to improving the wellbeing of all the apes at the facility through a comprehensive enrichment programme, and I hope Kumamoto Sanctuary will continue to receive funding to make further significant welfare improvements in the future.

I sincerely thank Prof. Hirata, Assistant Prof. Morimura, Assistant Prof. Yamanashi, Assistant Prof. Kano, Mr. Teramoto and Mr. Seres for their warm hospitality and stimulating conversations about environmental enrichment and animal welfare in general.

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**2. Others**



‘Honey Dippers’ Team (Photo 1: Yumi Yamanashi)



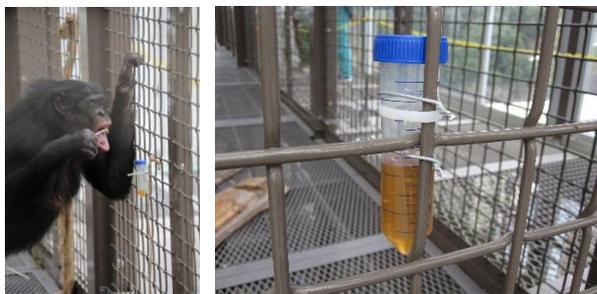
‘Toy Balls’ Team (Photo 2: Naruki Morimura)



‘Rolling Soy Balls’ Team  
(Photo 3: Naruki Morimura)



Staff checking the enrichment devices for safety  
(Photo 4: Naruki Morimura)



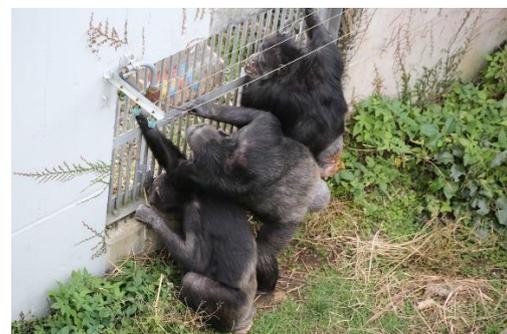
Bonobo using a chopstick and Honey Dipper  
(Photo 5 and 6: Yumi Yamanashi)



Bonobos using Rolling Soy Balls (left) and Toy Balls  
(Photo 7 and 8: Yumi Yamanashi)

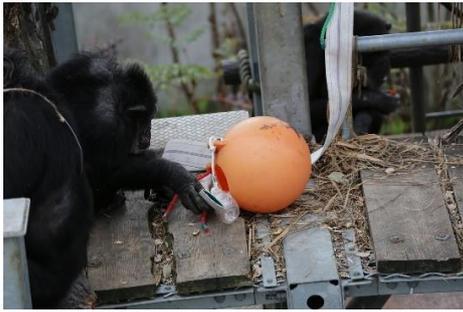


A chimpanzee using a chopstick and Honey Dipper  
(Photo 9: Yumi Yamanashi)



Chimpanzees using Rolling Soy Balls  
(Photo 10: Yumi Yamanashi)

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A chimpanzee manipulating a Toy Ball  
(Photo 11: Yumi Yamanashi)



Recording the duration chimpanzees used the devices  
(Photo 12: Naruki Morimura)



Preparing Birthday ‘Cake’ for a bonobo called Suzuken  
(Photo 13: Naruki Morimura)



Suzuken (a female bonobo) was 24 years old  
(Photo 14: Yumi Yamanashi)



Suzuken and Yoshiki (a male bonobo) eating fruit  
(Photo 15: Yumi Yamanashi)



Vijay (a male bonobo) enjoying apples  
(Photo 16: Naruki Morimura)



Kumamoto Sanctuary and surrounding scenery  
(Photo 17)



Host researchers and students  
(Photo 18: Yumi Yamanashi)