

Pan Africa News

The Newsletter of the Committee for the Care and Conservation of Chimpanzees, and the Mahale Wildlife Conservation Society



ISSN 1884-751X (print), 1884-7528 (online) mahale.main.jp/PAN/

JUNE 2015

VOL. 22, NO. 1

P. A. N. EDITORIAL STAFF

Chief Editor:

Kazuhiko Hosaka, *Kamakura Women's University, Japan*

Deputy Chief Editor:

Michio Nakamura, *Kyoto University, Japan*

Associate Editors:

Christophe Boesch, *Max-Planck Institute, Germany*

Jane Goodall, *Jane Goodall Institute, USA*

Tetsuro Matsuzawa, *Kyoto University, Japan*

William C. McGrew, *University of Cambridge, UK*

John C. Mitani, *University of Michigan, USA*

Vernon Reynolds, *Budongo Forest Project, UK*

Yukimaru Sugiyama, *Kyoto University, Japan*

Richard W. Wrangham, *Harvard University, USA*

Takeshi Furuichi, *Kyoto University, Japan*

Editorial Secretaries:

Noriko Itoh, *Kyoto University, Japan*

Koichiro Zamma, *Kyoto University, Japan*

Agumi Inaba, *Mahale Mts. Chimpanzee Research Project*

Eiji Inoue, *Kyoto University, Japan*

Instructions for Authors:

Pan Africa News publishes articles, notes, reviews, forums, news, essays, book reviews, letters to editor, and classified ads (restricted to non-profit organizations) on any aspect of conservation and research regarding chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*). Contributors are requested to write in English and the papers except forums, reviews and essays should usually be 1,500 words or less. Articles, notes and reviews will be peer-reviewed by at least one appropriate expert on request of the *PAN* editorial staff.

PAN is published twice a year in June and December. Deadline for manuscripts is two months before publication (*i.e.* the ends of April and October). Submit your manuscripts via email to pan.editor@gmail.com.

- **Manuscripts:** Format as DOC or RTF files
- **Photos and figures:** Format as JPEG or GIF files. Do NOT paste on Word files or create as PDF files. Figures could be sent as excel files also.
- **Audiovisual data:** Authors could include audiovisual data to enhance their papers, although they will be included in the online version only. Sound or video files should be sent only after communicating with the editor to obtain more detailed instructions.
- Send these **separately** by e-mail attachments.

See also <http://mahale.main.jp/PAN/instruction.html>.

Deadline of the next issue is October 2015!

Contents

<NEWS>

Mahale Research 50th Anniversary

Kazuhiko Hosaka

2

<NEWS>

Mahale 50 Book Coming Soon

Michio Nakamura, Kazuhiko Hosaka,

Noriko Itoh & Koichiro Zamma

3

<NOTE>

Photos from the Pioneer Period of Mahale

Michio Nakamura

(photographs by Toshisada Nishida)

4

<NOTE>

Root Eating by Wild Chimpanzees (*Pan troglodytes*) in the Kalinzu Forest, Uganda: Possible Medicinal Plant Use

Natsumi Aruga, Hodaka Matsuo,

Takeshi Furuichi & Chie Hashimoto

7

<NOTE>

Association of a Young Emigrant Female Bonobo during an Encounter with her Natal Group

Kazuya Toda, Tetsuya Sakamaki,

Nahoko Tokuyama & Takeshi Furuichi

10

50th
Mahale

<NEWS>

Mahale Research 50th Anniversary*Kazuhiko Hosaka*

Co-chairman, Mahale Wildlife Conservation Society,
c/o Kamakura Women's University, Japan
(E-mail: hosaka@kamakura-u.ac.jp)

A half century has passed since Junichiro Itani and his students met in September 1965 at the Kasakati Basin and decided to embark on a challenge of habituating wild chimpanzees of the Mahale Mountains (Itani 1970). Mahale had been a prospective candidate site for a long-term chimpanzee research since Itani went on his first expedition to Tanganyika in 1960 with Kinji Imanishi, his predecessor as the project leader (Itani 1961). However, it took the research team 4 years to reach Mahale until Kosei Izawa finally visited Kasoje just before the meeting (Izawa 1977). The initial priority of the team was to habituate chimpanzees living in savannah-woodland areas to the northeast of Mahale because researchers aimed to look for clues to understand how human ancestors shifted their habitats from forested to arid ones (Itani 1970).

Toshisada Nishida successfully habituated chimpanzees by artificial provisioning in July 1966, which was the start of the second longest-running chimpanzee research project. The food given to chimpanzees was later reduced and observational studies have been conducted without provisioning since 1987. The project was joined by many researchers including Kenji Kawanaka and Shigeo Uehara, and it has produced numerous scientific findings concerning the behaviour, ecology, and society of Mahale chimpanzees, although there is not enough space here to go into details.

In 1985, Mahale became the 11th national park of Tanzania, representing triumph for researchers who had dedicated two decades to research wildlife, especially chimpanzees, and to protect them from deforestation and other threats to survival. However, at the same time, the birth of the Mahale Mountains National Park presented dramatic societal and lifestyle changes for the Watongwe, indigenous people of Mahale. The Mahale Wildlife Conservation Society, established in 1994, has contributed to improvements in education and medical services of the local community. We believe that spontaneous involvement of the Watongwe people is crucial for environmental conservation because their ethnicity and traditional knowledge are closely connected to nature in and around Mahale.

Recently, the research team has broadened its focus beyond chimpanzees, partly as an inevitable response to modern-day demands to conserve 'biodiversity.' Leopard research has been initiated recently, whereas an interest in diurnal and nocturnal mammals that share habitats with chimpanzees is ongoing. In addition, some researchers, including Gen'ichi Idani and Hideshi Ogawa are continuing an extensive study regarding savannah-dwelling chimpanzees in Ugalla; this project was resumed in 1994 by Takayoshi Kano, who participated in a pioneer study there with Itani in 1966. A collaborative research project

to study wildlife in 'Greater Mahale'—covering a wide area including Mahale and Ugalla—is also ongoing for an integrative understanding of regional biodiversity, which is essential in terms of conservation strategies.



Figure 1. The poster for a public outreach event that will take place at the Yayoi Auditorium, University of Tokyo on 19 September 2015.

To commemorate the 50th anniversary of the Mahale Mountains Chimpanzee Research Project, various events will be held beginning this July. First, the workshop 'Fifty years of research on wild chimpanzees: Significance and future of long-term research' will be offered at the 31st Congress of the Primate Society of Japan in Kyoto on 18 July. Second, 'Mahale 50: Exhibition and symposium' will be held as a public outreach event in Tokyo on 19 September (Figure 1). Two new books edited by Mahale researchers are expected to be released during this event: one is a thick academic volume (in English) by many researchers who have studied Mahale chimpanzees (announced in this issue for details), and the other—written in Japanese by Nakamura for general readers—provides the history of Mahale chimpanzee research. Third, the symposium 'A half-century of wild chimpanzee research: How does long-term wild ape research contribute to anthropology?' will be held in Tokyo at the 69th Congress of the Anthropological Society of Nippon on 12 October. Finally, the ceremony to celebrate the 50th anniversary of international collaboration at Mahale is being planned to take place at Kigoma, Tanzania—perhaps in November.

The next issue of *Pan Africa News* will include reviews of some of these events.

REFERENCES

- Itani J 1961. [*The Forest of Gorillas and Pigmies.*] Iwanami-shoten, Tokyo, in Japanese.
 Itani J 1970. [*In the Pursuit of Chimpanzees.*] Chikumashobo, Tokyo, in Japanese.
 Izawa K 1977. [The chimpanzees of the Kasakati Basin, II.] In: [*The Chimpanzees.*] Itani J (ed). Kōdansha, Tokyo, pp. 187–248, in Japanese.

<NEWS>

Mahale 50 Book Coming Soon

Michio Nakamura¹, Kazuhiko Hosaka², Noriko Itoh¹ & Koichiro Zamma³

¹ Wildlife Research Center, Kyoto University, Japan

² Kamakura Women's University, Japan

³ Graduate School of Asian and African Area Studies, Kyoto University, Japan

(E-mail: nakamura@wrc.kyoto-u.ac.jp)

We are happy to announce here that we are finalizing a book, *Mahale Chimpanzees: 50 Years of Research*, which will soon be published from the Cambridge University Press (the publication is due in September 2015). Publication of this volume was planned in order to compile the research achievements that have been accumulated after half a century of research at Mahale.

As readers of *Pan Africa News* are well aware, the late Prof. Toshisada Nishida, the founder of chimpanzee research at Mahale, published a monograph on Mahale's chimpanzees, titled *Chimpanzees of the Lakeshore* (Nishida 2012). In the book, he described various episodes of his research life in Tanzania together with several important academic topics to which he dedicated his research career. However, the book was not intended to comprehensively cover the research topics investigated by other researchers at Mahale. Actually, he wanted to edit an encyclopedic volume about Mahale, which would complement his personal account. In the special issue of *Pan Africa News*, Emeritus Prof. Masao Kawai wrote as follows:

“Furthermore, he was preparing to compile all his longtime accomplishments into a lifework English language volume. I can hardly imagine how deeply he regretted having to go on his last journey without realizing such plans.” (Kawai 2011)

We, therefore, pursued his goal, making use of the apt opportunity of the 50th year of research at Mahale.

This coming book takes the form of an edited volume, composed of 50 chapters and seven appendices by a total of 24 authors. Each chapter summarizes the research outcomes that have been made from Mahale in addition to new unpublished data. Thus, with this single volume the reader will easily get access to the key information pub-

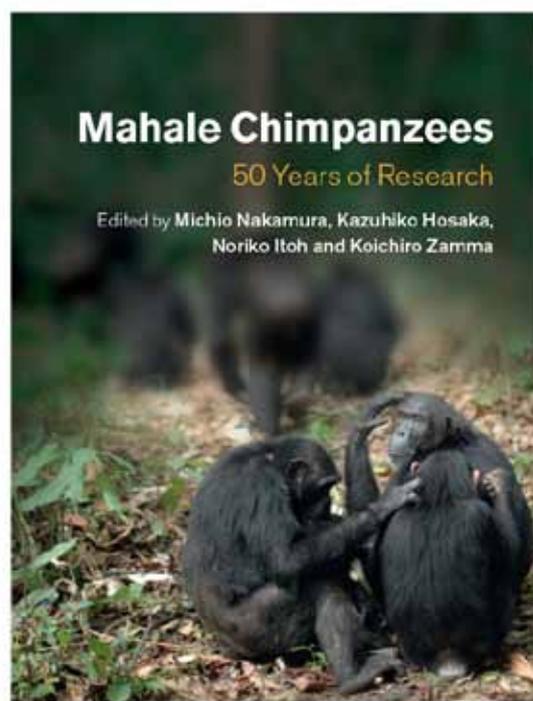
lished from Mahale. We also focused on the accumulation of the research effort of 50 years, thus, highlighting long-term changes in behavior wherever possible.

This is the fourth academic edited volume on Tanzanian chimpanzees by the Japanese research team. The former three volumes were published in 1977 (Itani 1977), 1990 (Nishida 1990), and 2002 (Nishida *et al.* 2002), respectively. This means each time span between publications is 12–13 years. The first and the third ones are in Japanese and the second and upcoming fourth ones are in English. Among 24 authors in the upcoming volume, none had contributed to the first book: By the time, none had yet started their careers as researchers, most of them were still in their childhood, and some were even not born yet! This shows how the current of time is.

Through compilation of the research outcomes over these 50 years, we have learned that we still have much more to know about chimpanzees. The research must go on. We hope this upcoming volume will facilitate even younger people to get interested in chimpanzees. In order to continue the Mahale research for another 50 years, we definitely need involvement of the younger generation.

REFERENCES

- Itani J (ed) 1977. [*The Chimpanzees.*] Kōdansha, Tokyo, in Japanese.
 Kawai M 2011. The passing of Professor Toshisada Nishida lamented. (translated by Hosaka K). *Pan Afr News* **18(special issue)**:1–2.
 Nishida T (ed) 1990. *The Chimpanzees of the Mahale Mountains: Sexual and Life History Strategies*. University of Tokyo Press, Tokyo.
 Nishida T 2012. *Chimpanzees of the Lakeshore: Natural History and Culture at Mahale*. Cambridge University Press, Cambridge.
 Nishida T, Uehara S, Kawanaka K (eds) 2002. [*The Mahale Chimpanzees: Thirty-Seven Years of <Panthropology>*]. Kyoto University Press, Kyoto, in Japanese.



<NOTE> Photos from the Pioneer Period of Mahale

*Michio Nakamura (photographs by
Toshisada Nishida)*

*Wildlife Research Center, Kyoto University, Japan
(E-mail: nakamura@wrc.kyoto-u.ac.jp)*

The late Prof. Toshisada Nishida, the founder of the Mahale Mountains Chimpanzee Research Project, left piles of research materials, such as field notes, photographs, videos, research memos, etc. These materials are precious information sources to know the early days of Mahale research and the chimpanzees. Nishida was also interested in traditional lifestyle of the Tongwe people who were living at Mahale when Nishida started the research. Thus the materials also includes ethnographic information of the Tongwe at the time.

The materials are now stored in a room at Wildlife Research Center, Kyoto University. By a grant from the Research Resource Archive, Kyoto University, we are now digitalizing these materials. Due to the large amount of materials and limited budgets, we have started from older photographs that were taken in 1960s and 1970s. Here I would like to show some of such photographs.



Figure 2. Nishida, Takayoshi Kano, Jun'ichiro Itani, Kosei Izawa and two Tanzanian research assistants (from left to right) at Kasakati Camp. Nishida first went to Kasakati before starting his research at Mahale. Taken in 1965.



Figure 1. A leaf from Nishida's slide photo files. The most of color photographs had originally been kept in this way. Now each slide film is dismounted and kept between a sheet in order to avoid oxidization.



Figure 3. At Kasakati Research Camp. Porters, Itani, and Kano (from left to right). Taken in 1965.



Figure 4. At Kasakati Research Camp. Itani is at the center carrying a gun. Taken in 1965.



Figure 5. A boat which was probably used by Nishida when he first went to Mahale. Taken in 1965.



Figure 6. Mahale Mountains viewed from the lakeshore of the Tanganyika. This photograph was taken on October 13, 1965, thus two days after Nishida's first arrival to Mahale.



Figure 7. Tongwe people probably at Kasiha Village at Mahale. They seem to be preparing for traditional dance and music. At the time Nishida arrived at Mahale, there still were several Tongwe villages there and people there were living in traditional way. Taken in 1965.



Figure 8. A Tongwe man with a lake fish, probably at Kasiha Village. Taken on October 13, 1965.



Figure 9. Chimpanzees of K group at Kansyana feeding site, taken on August 8, 1967, about a year after the success of the habituation. This was Nishida's second visit to Mahale.



Figure 10. Two early Tongwe research assistants, Issa Kapame Ally (left) and Ramadhani Nyundo (right) beating drums on a boat. Taken on August 11, 1967.



Figure 11. Nishida (left) and a Tongwe lady. Taken on November 4, 1968.



Figure 12. A Tongwe traditional instrument. Taken on October 4, 1968.



Figure 13. Tongwe men in a village. The man in the center has a traditional string instrument. Taken on October 4, 1968.



Figure 14. Chimpanzees at feeding site. Taken on August 15, 1969.

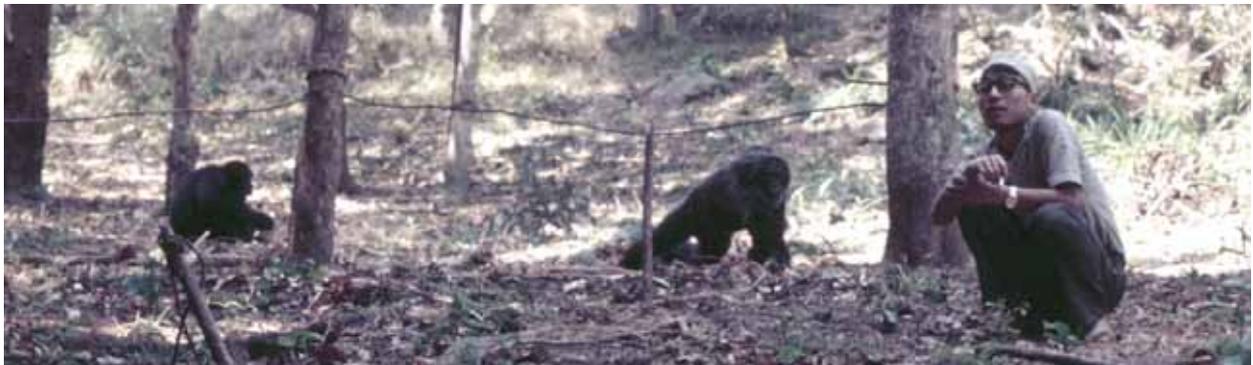


Figure 15. Chimpanzees and Nishida at feeding site. Taken on August 13, 1969. In this year, Nishida had already obtained his doctor's degree at Kyoto University. Kenji Kawanaka first joined the research in this year.



Figure 16. At Mt. Sibindi. Kawanaka is in front right. Taken on September 2, 1969.



Figure 17. Tongwe's traditional artifacts. The leopard skulls at the tips of dead branches are called *nsongole* that displays the location of a Tongwe chief, *mwami*. Taken on September 6, 1969.

<NOTE>**Root Eating by Wild Chimpanzees (*Pan troglodytes*) in the Kalinzu Forest, Uganda: Possible Medicinal Plant Use**

Natsumi Aruga, Hodaka Matsuo, Takeshi Furuichi & Chie Hashimoto

*Primate Research Institute, Kyoto University, Japan
(E-mail: aruga.223@gmail.com)*

INTRODUCTION

Although wild chimpanzees mainly feed on ripe fruit and other food items found above the ground (Wrangham 1977; Nishida & Uehara 1983; Goodall 1986), some studies have reported that chimpanzees feed on roots or tubers (Nishida & Uehara 1983; Kortlandt & Holzhaus 1987; McGrew *et al.* 1988; Newton-Fisher 1999; Lanjouw 2002; Morgan & Sanz 2006; Hernandez-Aguilar *et al.* 2007; Hockings *et al.* 2010; Watts *et al.* 2012). Among the chimpanzees observed eating roots or tubers, most were observed feeding on underground storage organs (USOs), and such behavior was mainly observed in drier environments (Kortlandt & Holzhaus 1987; McGrew *et al.* 1988; Lanjouw 2002; Hernandez-Aguilar *et al.* 2007).

Only a few studies have reported feeding on roots other than USOs. M group chimpanzees of the Mahale Mountains National Park, Tanzania, bite off and chew woody roots emerging from the ground (Nishida & Uehara 1983; Itoh & Nakamura in press). Chimpanzees of the Ngogo community in the Kibale National Park, Uganda, chew wood from the roots of *Neoboutonia macrocalyx* and discard the wadge after chewing on them (Watts *et al.* 2012). In this study, we report on chimpanzees feeding on wood from the roots in the Kalinzu Forest, Uganda, and discuss some possible roles of this behavior.

METHODS

We observed the M group of chimpanzees living in the Kalinzu Forest Reserve, located in western Uganda (0°17'N, 30°07'E) (Howard 1991; Hashimoto *et al.* 2001; Hashimoto & Furuichi 2006). M group has been under observation since 1997 and is habituated to the extent that during the current study period chimpanzees could be observed at a distance of less than 10 m on the ground. Complete identification of central individuals was achieved in 2003. During the current study period, M group included 15 adult males, 9 adolescent males, 25 adult females, 16 adolescent females, and 36 immature individuals. For individuals other than those who had been observed since birth, we estimated the age class from their body size according to the standard specified by Goodall (1986).

OBSERVATIONSObservation 1

On January 3, 2015, at 14:25, TF found an adult female *Pinka* feeding on a detached piece of root from a tree (approx. 30 cm × 3 cm). She repeatedly bit off a piece chewed it, and spat it out. After she stopped feeding on it and moved away at 14:33, we found a pile of discarded wadge on the ground (Figure 1). In a small stream approximately 10 m from the place where *Pinka* was sitting, we found many pieces of detached root, footprints of several chimpanzees, and tree roots that stuck out from the bank of the stream, and showed signs of having been bitten off (Figure 2). Because many tree roots were sticking out from the stream bank, we could not identify which tree the roots came from. TF chewed one of the pieces, but could not detect any particular taste.

Observation 2

On January 6, 2015, at 12:07, NA found *Gaia* (10-year-old female) sitting on a branch, eating something similar to a root. At 12:19, she finished eating it. We could



Figure 1. The wadge *Pinka* spat out (Photograph by Takeshi Furuichi).



Figure 2. The tree roots sticking out from the stream bank showing the bitten-off ends (Photograph by Takeshi Fruichi).

not identify what she ate because she ate all of it. We did not observe her spitting any wadge out.

Observation 3

On January 6, 2015, at 14:04, NA found *Gale* (6-year-old female) and her sister *Gaia* eating roots of a fallen tree at the edge of the stream. At 14:08, *Gaia* climbed up into a nearby tree with a part of the root. She ate it while sitting on a branch. At 14:09, *Minny* (adult female) approached and started eating roots of the fallen tree with *Mizuki* (0-year-old offspring of *Minny*) on her chest. *Minny* directly bit off a root and chewed it (Video 1: available online at [mahale.main.jp/PAN/22_1/22\(1\)_04.html](http://mahale.main.jp/PAN/22_1/22(1)_04.html)). At 14:15, *Gale* came back and started eating a piece of the root with *Minny*. At 14:29, *Minny* pulled out another root from the ground, by grasping a part of it that was found on the surface and ate it. At 14:31, *Gale* spat out a part of the root that she was chewing. At 14:37, they finished eating roots. All leaves of the tree had already fallen, but the bark was fresh. The tree was identified as *Neoboutonia macrocalyx* (Eupborbiaceae) from the color and texture of the bark and the smell of the wood. Although we only observed spitting out of wadge once, we found many pieces of wadge around the tree (Figure 3).

Observation 4

On January 8, 2015, NA observed *Iku* (9-year-old female) and her sister *Iyo* (5-year-old female) eating roots. At 13:14, *Iku* climbed down from the tree. At 13:16, *Iku* climbed up the same tree with a piece of root and at 13:17, began to eat it. At 13:18, *Iyo* approached *Iku*, and she took the root from *Iku*. At 13:19, *Iyo* started to eat it. At 13:40, *Iyo* obtained it back from *Iku* and moved away. We did not observe them spitting out wadge material during this observation (Video 2: available online at [mahale.main.jp/PAN/22_1/22\(1\)_04.html](http://mahale.main.jp/PAN/22_1/22(1)_04.html)).

DISCUSSION

Feeding on roots other than USOs is rare in chimpanzees. The lists of items ingested by chimpanzees at several study sites do not mention “root” as a plant part eaten by chimpanzees (Bossou: Sugiyama & Koman 1987 but see Hockings *et al.* 2010; Mt. Assirik: McGrew *et al.* 1988; Kibale: Chemurot *et al.* 2012), and lists from other study sites contain only few species of root items ingested (Kahuzi: 1 species, Basabose 2002; Budongo: 1 species, Fawcett 2000; Ngogo: 3 species, Watts *et al.* 2012; Mahale: 2 species, Itoh *et al.* in press). Watts *et al.* (2012) have reported that time spent feeding on roots was only 0.4% of total feeding time. Feeding on roots may be rare occurrence because roots are not easily obtainable by chimpanzees. In this study, chimpanzees obtained roots that were emerging from the bank of a stream or from a fallen tree. In Mahale, chimpanzees bit-off and chewed roots emerging from the ground (Nishida & Uehara 1983; Itoh & Nakamura in press). Although chimpanzees were observed eating roots that existed under the ground, they obtained the roots by pulling a portion of the roots that was found above the ground (Kalinzu: this study; Mahale: Itoh & Nakamura in press).

Chimpanzees and gorillas often chew woody roots or wood pulp material without swallowing it (this study; Rothman *et al.* 2006; Reynolds *et al.* 2009; Watts *et al.* 2012; Itoh and Nakamura in press). Wood is characteristically highly fibrous, relatively indigestible, and poor in nutrients (Waterman 1984). Therefore, chimpanzees may chew roots because they contain micronutrients such as sodium (Budongo: Reynolds *et al.* 2009; Bwindi: Rothman *et al.* 2006).

Furthermore, it is also possible that chimpanzees eat roots for medicinal purposes. Huffman (1997) has argued that live/dry wood feeding by chimpanzees is a possible form of medicinal plant use. Root eating observed in this study may also be classified as medicinal plant use by chimpanzees. In Kalinzu and Ngogo (Watts *et al.* 2012), chimpanzees ate woody roots of *Neoboutonia macro-*



Figure 3. There were many pieces of wadge around the roots (Photograph by Natsumi Aruga).

calyx. The stem bark of *Neoboutonia macrocalyx* has medicinal properties (Kirira *et al.* 2007; Namukobe *et al.* 2014). In fact, local people in Uganda use the stem bark of *Neoboutonia macrocalyx* to treat stomach ache and malaria (Namukobe *et al.* 2011). However, further investigation is required to determine the presence or absence of bioactive compounds in the roots in the same state as those being consumed by chimpanzees, and to evaluate the health status of consumers before and after consumption of root material before assuming further conclusions (Huffman 1997). Our observations provide new evidence suggesting the need to further evaluate this interesting behavior in chimpanzees.

ACKNOWLEDGEMENTS

We thank the National Forestry Authority of Uganda, Uganda National Council for Science and Technology for research permits. We thank the research assistants and other workers in Kalinzu for supporting us. Furthermore, we thank members of the Primate Research Institute (PRI), Kyoto University, and researchers conducting research on primates in Kalinzu for various support and encouragement. This study was financially supported by JSPS Grants-in-Aid for Scientific Research (40379011 to Hashimoto; 26257408 to Furuichi; 25257495 to Ihobe; 25257407 to Yumoto), the JSPS Asia-Africa Science Platform Program (2012–2014 to Furuichi), and the Leading Graduate Program in Primatology and Wildlife Science (to Kyoto University).

REFERENCES

- Basabose AK 2002. Diet composition of chimpanzees inhabiting the montane forest of Kahuzi, Democratic Republic of Congo. *Am J Primatol* **58**:1–21.
- Chemurot M, Isabirye-Basuta G, Sande E 2012. Amount of plant foods eaten and sexual differences in feeding among wild chimpanzees (*Pan troglodytes*) of Kanyawara community. *ISRN Zoology*, Article ID 120250.
- Fawcett KA 2000. *Female Relationships and Food Availability in a Forest Community of Chimpanzees*. PhD Thesis, University of Edinburgh, Edinburgh.
- Goodall J 1986. *The Chimpanzees of Gombe*. Harvard University Press, Cambridge MA.
- Hashimoto C, Furuichi T 2006. Frequent copulations by females and high promiscuity in chimpanzees in the Kalinzu Forest, Uganda. In: *Primates in Western Uganda*. Newton-Fisher NE, Notman H, Paterson JD, Reynolds V (eds), Springer, New York, pp. 247–257.
- Hashimoto C, Tashiro Y, Furuichi T 2001. What factors affect the size of chimpanzee parties in the Kalinzu Forest, Uganda? Examination of fruit abundance and number of estrous females. *Int J Primatol* **22**:947–959.
- Hernandez-Aguilar AR, Moore J, Pickering TR 2007. Savanna chimpanzees use tools to harvest the underground storage organs of plants. *Proc Natl Acad Sci USA* **104**:19210–19213.
- Hockings KJ, Anderson JR, Matsuzawa T 2010. Flexible feeding on cultivated underground storage organs by rainforest-dwelling chimpanzees at Bossou, West Africa. *J Human Evol* **58**:227–233.
- Howard PC 1991. *Nature Conservation in Uganda's Tropical Forest Reserves*. IUCN, Gland, Switzerland.
- Huffman MA 1997. Current evidence for self-medication in primates: a multidisciplinary perspective. *Yearb Phys Anthropol* **40**:171–200.
- Itoh N, Nakamura M in press. Diet and feeding behavior. In: *Mahale Chimpanzees: 50 Years of Research*. Nakamura M, Hosaka K, Itoh N, Zamma K (eds), Cambridge University Press, Cambridge.
- Itoh N, Zamma K, Matsumoto T, Nishie H, Nakamura M in press. Appendix II Dietary list. In: *Mahale Chimpanzees: 50 Years of Research*. Nakamura M, Hosaka K, Itoh N, Zamma K (eds), Cambridge University Press, Cambridge.
- Kirira PG, Rukunga GM, Wanyonyi AW, Muthaura CN, Mungai GM 2007. Tigliane Diterpenoids from the Stem Bark of *Neoboutonia macrocalyx*. *J Nat Prod* **70**: 842–845.
- Kortlandt A, Holzhaus E 1987. New data on the use of stone tools by chimpanzees in Guinea and Liberia. *Primates* **28**:473–496.
- Lanjouw A 2002. Behavioural adaptations to water scarcity in Tongo chimpanzees. In: *Behavioural Diversity in Chimpanzees and Bonobos*. Boesch C, Hohmann G, Marchant LF (eds), Cambridge University Press, Cambridge, pp. 52–60.
- McGrew WC, Baldwin PJ, Tutin CEG 1988. Diet of wild chimpanzees (*Pan troglodytes verus*) at Mt. Assirik, Senegal: I. Composition. *Am J Primatol* **16**:213–226.
- Morgan D, Sanz C 2006. Chimpanzee feeding ecology and comparisons with sympatric gorillas in the Goulougo Triangle, Republic of Congo. In: *Feeding Ecology in Apes and Other Primates: Ecological, Physical and Behavioural*

- Aspects*. Hohmann G, Robbins MM, Boesch C (eds), Cambridge University Press, Cambridge, pp. 97–122.
- Namukobe J, Kasenene JM, Kiremire BT, Byamukama R, Kamatenesi-Musisha M, Krief S, Dumontet V, Kabasa JD 2011. Traditional plants used for medicinal purposes by local communities around the Northern sector of Kibale National Park, Uganda. *J Ethnopharmacol* **136**:236–245.
- Namukobe J, Kiremire BT, Byamukama R, Kasenene JM, Akala HM, Kamau E, Dumontet V 2014. Antiplasmodial compounds from the stem bark of *Neoboutonia macrocalyx* pax. *J Ethnopharmacol* **162**:317–322.
- Newton-Fisher NE 1999. The diet of chimpanzees in the Budongo Forest Reserve, Uganda. *Afr J Ecol* **37**:344–354.
- Nishida T, Uehara S 1983. Natural diet of chimpanzees (*Pan troglodytes*): Long-term record from the Mahale Mountains, Tanzania. *Afr Stud Monogr* **3**:109–130.
- Reynolds V, Lloyd AW, Babweteera F, English CJ 2009. Decaying *Raphia farinifera* palm trees provide a source of sodium for wild chimpanzees in the Budongo Forest Uganda. *PloS one* **4**:e6194.
- Rothman JM, Soest PJV, Pell AN 2006. Decaying wood is a sodium source for mountain gorillas. *Biol Lett* **2**:321–324.
- Sugiyama Y, Koman J 1987. A preliminary list of chimpanzees' alimentations at Bossou, Guinea. *Primates* **28**:199–147.
- Waterman PG 1984. Food acquisition and processing as a function of plant chemistry. In: *Food Acquisition and Processing in Primates*. Chivers DJ, Wood BA, Bilsborough A (eds), Plenum Press, New York, pp. 177–211.
- Watts DP, Potts KB, Lwanga JS, Mitani JC 2012. Diet of Chimpanzees (*Pan troglodytes schweinfurthii*) at Ngogo, Kibale National Park, Uganda, 1. Diet composition and diversity. *Am J Primatol* **74**:114–129.
- Wrangham RW 1977. Feeding behaviour of chimpanzees in Gombe National Park, Tanzania. In: *Primate Ecology: Studies of Feeding and Ranging Behaviour in Lemurs, Monkeys and Apes*. Clutton-Brock TH (ed), London Academic Press, London, pp. 504–538.

<NOTE>

Association of a Young Emigrant Female Bonobo during an Encounter with her Natal Group

Kazuya Toda, Tetsuya Sakamaki,
Nahoko Tokuyama & Takeshi
Furuichi

Primate Research Institute of Kyoto University, Japan
(E-mail: toda.kazuya.78x@st.kyoto-u.ac.jp)

INTRODUCTION

Sex-biased dispersal is an almost ubiquitous feature of the life histories of group-living mammals (Handley & Perrin 2007). Most primates resemble other mammals in showing male-biased dispersal, which is considered to be related to the fact that female reproductive success is limited primarily by nutritional constraints in mammals where females bear the major burden of investment of their offspring, such as birth and nursing (Greenwood 1980). On the other hand, societies of chimpanzees and bonobos show clear female-biased dispersal: females usually transfer between groups upon reaching sexual maturity (Thompson 2013; Sakamaki *et al.* in press). Although inbreeding avoidance may be a plausible ultimate factor of sex-biased dispersal in mammals (Pusey 1980), it has not

been well understood why females emigrate from natal groups in these species. Similarly, proximate factors for female transfer remain poorly understood due to the difficulty of successive observations of young females before and after their transfer. Therefore, more information is needed on the process of female transfer between groups.

Bonobo societies maintain relatively less antagonistic relations between groups, and affiliative interactions are observed between members of different groups during encounters (Idani 1990; Furuichi 2011). Young females often migrate between groups during inter-group encounter not only once but also repeatedly (Sakamaki *et al.* in press). Association patterns of young females during the encounters should reflect their motivation to emigrate into another group or to remain in the current group. Here, we report observations of a young emigrant female during an encounter between her current group and her natal group over four successive days. We show the association patterns and social interactions of the young female with members of both groups.

MATERIALS & METHODS

Observations for this study were made at Wamba in the northern sector of the Luo Scientific Reserve in DR Congo (Furuichi *et al.* 1998). Studies at Wamba started in 1973, but were interrupted from 1996 to 2002 due to the civil war. Research was resumed in 2003, and one study group (E1) has been followed on a daily basis since. Researchers had also observed a western adjacent group (P) until 1996, and observation of this group resumed with intensive habituation on a daily basis in September 2010. This group was renamed 'P-east' (Pe) to differentiate it from another western group, 'P-west' (Pw). All animals in Pe group were identified by August 2011. The E1 group consisted of 36 animals and the Pe group consisted of 26 animals in August 2014.

A young female (Puffy) was first identified in the Pe group in November 2010 (Figure 1). From our observa-



Figure 1. Puffy in March 2015.

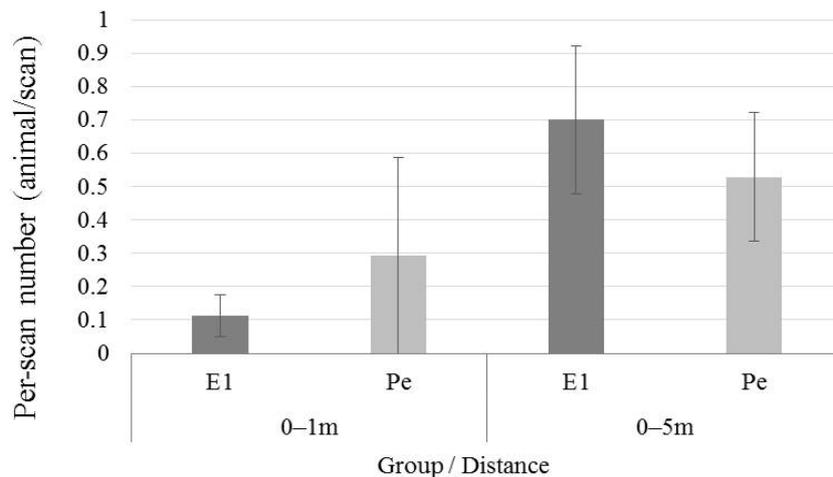


Figure 2. Comparisons of per-scan number of animals found in Puffy's proximity (in 116 scans) between the E1 and Pe groups. This figure shows how frequently E1 or Pe animals were observed within 1 m or 5 m of Puffy. Error bars show the standard deviation. We resampled one scan for 30 min ($N = 24$; 144 scans/6 scans) to avoid auto-correlation and performed a Wilcoxon signed rank test to examine the difference between the number of E1 animals and that of Pe animals within 1 and 5 m. There were no significant differences between the number of E1 and Pe members either within 1 m ($T = 31$, $N = 24$, n.s.) or within 5 m ($T = 70$, $N = 24$, n.s.).

tions, we assumed that an adult female (Pao) was her mother and a female infant (Pipi) was her younger sister. She was estimated to be 7 years old from her body size and the inter-birth interval with Pipi, whose age was estimated at 2 years (the inter-birth interval in bonobos is considered to be approximately 4.8 years; Furuichi *et al.* 1998). She emigrated from the Pe group to E1 group on October 12, 2013 during an encounter between the groups, and has remained with the E1 group ever since. The next encounter between the Pe and E1 groups occurred on August 16, 2014, when Puffy met members of her natal group for the first time since her emigration.

On August 16, 2014, an inter-group encounter occurred in the area that Pe group usually ranged. Puffy arrived at the area with E1 members. The groups were repeatedly within sight of each other, and when separated were usually within earshot until August 19. One of the authors (KT) recorded the behaviors of Puffy via focal animal sampling for approximately 3 hours per day during these four days. KT also recorded the identities of animals that were observed within 5 m using scan sampling at 5 minute intervals during focal animal observations. A total of 144 scan samples were recorded over four days, and we used data from 116 scan samples excluding 28 scan samples when KT lost sight of Puffy from the analysis (25 samples on August 16, 31 samples on August 17, 27 samples on August 18, 33 samples on August 19). Frequencies of social grooming with Puffy were determined from these scan data. We used the records of animals within 5 m of Puffy to compare the mean number of animals in all scans (called "per-scan number" hereafter) and the actual number of animals on each day (called "all-day number" hereafter) between the E1 group (27 animals) and Pe group (23 animals), excluding infants (<4 years old). The all-day number was calculated by counting animals found in the proximity of Puffy at least once

in a day.

RESULTS & DISCUSSION

Figure 2 compares the mean number of E1 animals and Pe animals found in Puffy's proximity in 116 scans. In these scans, an average of 0.11 animals from the E1 group and 0.29 animals from the Pe group were found within 1 m of Puffy, while 0.70 animals from the E1 group and 0.53 animals from the Pe group were recorded within 5 m. A statistical test where we resampled one scan for 30 min to avoid auto-correlation did not show a significant difference in the per-scan number between the E1 and Pe members at either distance. Figure 3 compares the all-day number of animals found in the proximity of Puffy on each day between the E1 and Pe groups. There was no difference between the numbers of E1 and Pe members within 1 m of Puffy. However, while there were no specific animals among E1 members regularly found within 1 m, two members of the Pe group were very frequently found within 1 m of Puffy (Marie, a young adult female: 24 times, 71% of all scan records of Pe animals in 1 m proximity; and Michio, a juvenile male: 6 times, 18% of all scan records). Puffy exchanged social grooming with these two animals more frequently (11 scans with Marie and 3 scans with Michio out of 16 scans with social grooming) than with E1 members. On the other hand, 24 animals from the E1 group (89% of all E1 members) and 11 animals from the Pe group (48% of all Pe members) were found within 5 m at least once in all scans (116 scans). These results suggest that Puffy ranged more with E1 members than Pe members during the focal observation. Thus, Puffy appeared to associate with E1 members rather than Pe members for the four days of the study period, while she had much more frequent grooming interactions with specific animals of her natal group.

Although both Pao and Puffy were observed on all

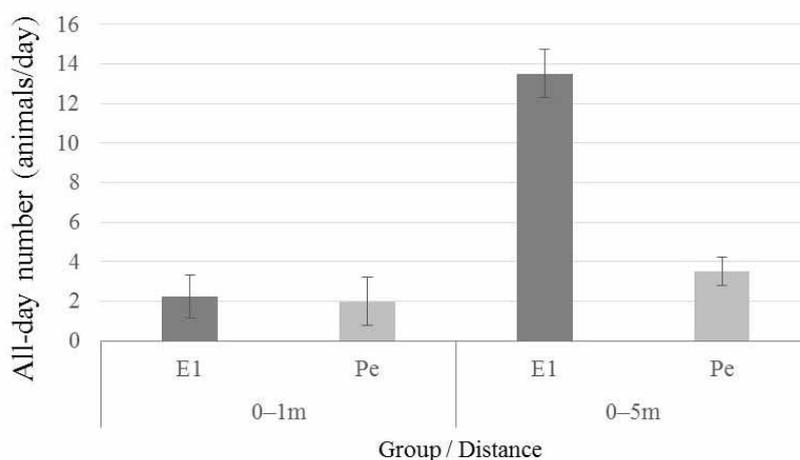


Figure 3. Comparisons of the all-day number of animals found in Puffy's proximity for each day of observation (N = 4 days). This figure shows how many E1 or Pe animals were recorded within 1 m or 5 m of Puffy on each day. Error bars show the standard deviation.

four days, Pao was observed within 5 m of Puffy in only one of the 116 scans conducted. Puffy was observed interact with Pao on the first day of the group encounter: NT observed that Puffy played with Pao and begged her for food during ad libitum observation. However, no social interactions between them were observed in focal observations. These results suggest that neither Puffy nor Pao paid particularly attention to one another during the observation. Puffy was frequently observed to associate with Pao before her emigration in 2013, although she rarely groomed with her. Therefore, the relationship between Puffy and Pao appeared to have changed gradually before her emigration.

This was the first observation of an emigrant female during an encounter with her natal group members at Wamba. Interestingly, Puffy seemed estranged from her mother and members of her natal group after 10 months of separation although she interacted with some young animals of her natal group. She may have already become the member of the E1 group in the 10 months. This observation suggests that Puffy has no motivation to return to her natal group although it cannot be asserted that the cause is a change of her group identity into the new group. Habituation of several other groups adjacent to E1 and Pe is currently proceeding at Wamba. We expect that the accumulation of similar observations will contribute to an increased understanding of how female bonobos decide on transfers between groups.

ACKNOWLEDGEMENTS

This research was financially supported by the Leading Graduate program in Primatology and Wildlife Science of Kyoto University (to KT), the Japan Society for the Promotion of Science (JSPS) Asia-Africa Platforms (to TF), the Japan Ministry of the Global Environment Research Fund (to TF), JSPS Grants-in-Aid for Strategic Young Researcher Overseas Visits Program for Accelerating Brain Circulation (to Primate Research Institute, Kyoto University), and JSPS HOPE project of the Primate Research Institute of Kyoto University, JSPS Research Fellowships for Young Scientist (to NT). We thank the DR Congo Ministry of Science for permission to conduct

research at Wamba. We also thank the local staff and others at Wamba for their support during our study.

REFERENCES

- Furuichi T 2011. Female contributions to the peaceful nature of bonobo society. *Evol Anthropol* **20**:123–142.
- Furuichi T, Idani G, Ihobe H, Kuroda S, Kitamura K, Mori A, Enomoto T, Okayasu N, Hashimoto C, Kano T 1998. Population dynamics of wild bonobos (*Pan paniscus*) at Wamba. *Int J Primatol* **19**:1029–1043.
- Greenwood PJ 1980. Mating systems, philopatry and dispersal in birds and mammals. *Anim Behav* **28**:1140–1162.
- Handley L, Perrin N 2007. Advances in our understanding of mammalians sex-biased dispersal. *Molecul Ecol* **16**:1559–1578.
- Idani G 1990. Relations between unit-groups of bonobos at Wamba, Zaire: Encounters and temporary fusions. *Afr Stud Monogr* **11**:153–186.
- Pusey AE 1980. Inbreeding avoidance in chimpanzees. *Anim Behav* **28**:543–552.
- Sakamaki T, Behncke I, Laporte M, Mulavwa M, Ryu H, Takemoto H, Tokuyama N, Yamamoto S, Furuichi T in press. Intergroup transfer of females and social relationships between immigrants and residents in bonobo (*Pan paniscus*) societies. In: *Dispersing Primate Females: Life History and Social Strategies in Male-Philopatric Species*. Furuichi T, Yamagiwa J, Aureli F (eds), Springer, Tokyo.
- Thompson ME 2013. Reproductive ecology of female chimpanzees. *Am J Primatol* **75**:222–237.

Pan Africa News, Vol. 22, No.1

Published in June, 2015

Address: c/o Human Evolution Studies,
Dept. of Zoology, Faculty of Science,
Kyoto Univ., Kyoto, 606-8502, JAPAN

TEL: (+81)75-753-4093

FAX: (+81)75-753-4115

E-mail: pan.editor@gmail.com

URL: <http://mahale.main.jp/PAN/>

ISSN: 1884-751X (Print), 1884-7528 (Online)