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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 bilias (*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 and notes will be peer-reviewed by at least one appropriate expert on request of the *PAN* editorial staff.

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PAN is published twice a year in June and December. Deadline for manuscripts is one month before publication (*i.e.* the ends of May and November).

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<OBITUARY>
Professor Toshisada Nishida: Chief Editor of *Pan Africa News*

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Dr. Toshisada Nishida, Professor Emeritus of Kyoto University and Executive Director of the Japan Monkey Centre, passed away in Kyoto on 7 June, 2011. He was 70 years old. For the last five years of his life, he fought against rectal cancer and pursued his professional life as a primatologist to the very end.

Prof. Nishida was best-known for his pioneering research on the wild chimpanzees of the Mahale Mountains, Tanzania. The project, now called 'Mahale Mountains Chimpanzee Research Project' (MMCRP), is the second-oldest ape field study, preceded only by Dr. Jane Goodall's Gombe project. When only a 24-year-old graduate student, Prof. Nishida was dispatched to Mahale in 1965 as

Moshi Hamisi (Left), Prof. Nishida (Center), and Rashidi Kitopeni (Right). At Kansyana, on 27 August 2009. Photo by Kazuhiko Hosaka.

part of the late Prof. Junichiro Itani's grand-scale project to investigate the wild chimpanzees of western Tanzania. He succeeded in habituating the Mahale chimpanzees by giving them sugarcane and banana (Food provisioning was abandoned in the mid-1980s).

In 1968, he published the first empirical report[1] on chimpanzee social structure and introduced his idea of the 'unit-group' (also referred to as 'community' by many researchers), in which chimpanzees interact with each other on the basis of stable membership in closed structure.

Joined by many excellent field-workers, such as the late Profs. Kenji Kawanaka and Shigeo Uehara, Prof. Nishida contributed substantially to primatology in the international arena by publishing so many peer-reviewed articles about chimpanzees that I cannot go deep into detail here (but see other obituaries coming soon in several primatological journals). He also edited academic primatology books in English[2–4]. For the last decade, he was enthusiastic about video-recording chimpanzee behavior, which yielded a definitive ethogram of the Mahale chimpanzees[5].

In addition, he devoted much energy to conservation. Together with the late Prof. Itani, he organized a campaign to make Mahale a protected area. Their efforts were realized in 1985, when Mahale was designated as a national park of Tanzania.

In 1994, he collaborated with Prof. Hosea Kayumbo, University of Dar es Salaam, to found the 'Mahale Wildlife Conservation Society' (MWCS), and he served as its co-chairman. He not only made efforts to conserve wildlife within the park but also endeavored to initiate community-based conservation in villages north of the park. Believing that education of local children and improvement of public hygiene are vital to wildlife conservation, he negotiated with the Embassy of Japan in Tanzania for Grant Assistance for Grassroots Projects and successfully built Katumbi Primary School (2003) and Katumbi Dispensary (2011).

He extended his passion for great ape conservation on a global scale. In 2001, he was appointed one of the five UNEP (United Nations Environment Programme) Special Envoys for Great Apes and later served as a GRASP (Great Apes Survival Project) patron.

He also served as President of International Primatological Society (1996–2000), President of Primate Society of Japan (2001–2005), and Editor-in-Chief of the scientific journal, *Primates* (2004–2011).

He won the Jane Goodall Award (1990), the Leakey Prize (2008), the International Primatological Society Lifetime Achievement Award (2008), and the Chunichi Cultural Prize (2010).

Pan Africa News (*PAN*) was launched in 1994 by Prof. Nishida, who agreed with Dr. Goodall's advice that field-workers studying wild *Pan* species at various field sites in Africa needed a forum in which to exchange early scientific findings and useful information about conservation. I remember the initial days, in which I discussed the role of *PAN* with him and Dr. Linda A. Turner, who edited the first issue. In 1997, Prof. Nishida set up the editorial board and launched the peer-review system for this journal and served as its Chief Editor until his death.

On 30 January, 2011, Prof. Nishida, who was facing the final stage of his illness, called in Dr. Michio Nakamura, Associate Professor of Kyoto University, and me, in order to talk about handing over his work. He asked Dr. Nakamura to act as the new organizer of MMCRP, adding that we should continue our long-term study of Mahale chimpanzees for at least a century. Then he asked me to take over his duties as co-chairman of MWCS and Chief Editor of *PAN*.

After that day, he shifted his attention to the publication of his last book[6]. He stressed that this would be his first English-language book about Mahale chimpanzees for general readers, although he had written many books for the Japanese public. His work was well-known to primatologists, but less so to the international general public. Thanks to the generous dedication of Prof. William C. McGrew, University of Cambridge, the book will appear at the end of 2011.

He was involved with higher education at the University of Tokyo (18 years) and Kyoto University (15 years). Under his supervision, many biological anthropologists and primatologists were trained and are pursuing their careers in various disciplines, as well as chimpanzee research.

To be frank, it is hard for me to accept the reality of his death, owing to still-vivid memories of his final journey to Mahale, when he observed his beloved chimpanzees in the forest for the last time (I accompanied him there in August 2009). Personal recollections of his legendary accomplishments in the field will be gathered and shared among his friends and colleagues in a future special issue of *PAN*.

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Tribute

June 12th 2011

I am deeply saddened to learn of the death of Dr. Toshisada Nishida. I have known Toshi for over forty years and his name will always be associated for me with the chimpanzees of the Mahale Mountains. His careful research has provided us with a rich picture of the way of life and the personalities of these chimpanzees.

Toshi was tireless in the field, logging up thousands of hours of direct observation and building up a dynamic team of researchers, so that the work could be maintained throughout the year, on an ongoing basis. These researchers studied different aspects of chimpanzee social life and ecology. All of this information has been shared not only in Japanese, with Japanese scientists, but also, in English, made available to primatologists around the world. He also initiated "Pan Africa News", a forum that encouraged all chimpanzee researchers to contribute short articles about their scientific and conservation work, so that it brought together information from many different places and disciplines.

The death of Dr. Toshisada Nishida marks a milestone in the long history of Japanese primatology. He made a huge contribution to our understanding of chimpanzees during his lifetime, and he inspired many young people to follow in his footsteps, not only in Mahale, but in other parts of Africa. But it is not only Toshi the scientist who will be missed. I also shall miss Toshi as a friend; I shall miss all the marvellous gatherings and small dinners that he organized where people could relax and share chimpanzee stories in an informal setting. Indeed, I find it difficult to imagine Japan without him. My deepest sympathies go out to his family and to all his many friends.

Jane Goodall

***Editorial Note:** We asked Dr. Jane Goodall to pay tribute to "Toshi Nishida", one of her long-time friends who shared an interest in the wild chimpanzees of the lakeshore of Tanganyika. She responded quickly, although she was fully occupied with her lecture tour of Australia. We express our deepest gratitude for her kindness and generosity.

<ARTICLE>
A Wild Chimpanzee Uses a Stick to Disable a Snare at Bossou, Guinea

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INTRODUCTION

Using sticks as a tool is common among wild chimpanzees[1]. Chimpanzees in their natural habitat use stick tools to serve a variety of purposes, for example termite fishing[2], ant dipping[3], pestle pounding[4], algae scooping[5], honey dipping[6], probing and exploring tree holes for animal prey or water. The majority of these tool-use behaviors are targeted at food resources, *i.e.* social insects or their products. But sticks are also sometimes used in defense; they may be brandished as clubs[7] or hurled as missiles[8] at snakes, predators or humans.

We describe here an episode whereby a young adult male chimpanzee employed a stick to disable the trap mechanism of a self-locking wire snare. This case supplements other examples of stick-tool in the context of defense which principally involve aimed or unaimed throwing of a stick towards a threatening life form. This episode reflects the flexible ability of wild chimpanzees to respond to threatening inanimate human-made object.

MATERIALS AND METHODS

The chimpanzee (*Pan troglodytes verus*) community of Bossou, Guinea, inhabits primary and secondary forests surrounding the village. These chimpanzees are habituated to observers and has ranged in size between 12 and 23 individuals since 1976[9]. Bossou chimpanzees were provisioned for three months from the end of 1989 to the early 1990[10] and for one to 3 weeks annually during the following decade for the purposes of field experiments[11]. Provisioned foods were mainly oil-palm (*Elaeis guineensis*) nuts which were collected within the core-area of chimpanzees. The described event was witnessed in 2005, when community membership was at its lowest with 12 individuals. The community comprised then three adult males and the youngest, 14 year old Yolo (YL), was the alpha male of the community at the time.

The villagers of Bossou have long used wire snares to protect their cultivated fields from animal pests such as rodents, especially cane rats (*Thryonomys swinderianus*) and for capturing small mammalian prey for meat. At the end of 1989, the use of snares was officially prohibited in the chimpanzees' core area after a juvenile female chimpanzee, named Yunro, had her left leg severely maimed by a wire snare. She was unable to locomote properly for years thereafter. Nevertheless, some villagers continued to set snares in the forest to trap cane rats and other small animals for subsistence purposes.

RESULTS

On August 16th, 2005 at 3:09 pm, YL was grinning and uttered a loud and high pitched bark or scream. The other chimpanzees, five females and juveniles, present in the party suddenly froze and gazed in the direction that YL was staring. He slowly approached the snare and picked up a dead branch about 30 cm long. He stirred a pile of fallen leaves and slapped the ground with the stick. About 40 cm away there was a young tree 2.5 m tall which had clearly been bent and secured in place with a plastic cord tied to the end. The cord then ran to the ground. Food is usually laid onto a fragile platform typically comprised of small horizontal sticks covered with leaves; when the animal steps on the platform, the latter collapses and unleashes the snare. A metal wire snare then grips the animal and tightens as it aims to flee. Except for the bent-over sapling and cord, other parts of the snare were unnoticeable and well camouflaged. Screaming loudly, YL repeatedly stirred the fallen leaves in front of the bent-over sapling but the stick failed to trigger the snare's mechanism; the stick used was too short to attain the concealed wire.

After 2 min, one of our local guides approached YL to get a better view of the snare. YL then gave up attacking the snare and slowly walked away leaving the stick behind. The other chimpanzees continued to look at the snare for a moment but soon followed him one by one. The chimpanzee party began to travel and did not return to the area during the remaining several hours that they were observed that day. The snare was left undamaged and intact.

We observed no other available stick or dead branch on the ground nearby although there were many small trees and branches in the vicinity. If YL had broken off a branch of more than 1 m in length, he could have successfully disabled the snare from a safe distance.

DISCUSSION AND CONCLUSION

We already know that at least some adult male chimpanzees at Bossou understand that snares are dangerous, particularly to juveniles and infants. Over the years, we have witnessed several attempts to disable snares whenever they are encountered[12]. In the present episode YL, the 14 year old alpha ranking male, readily recognized the snare comprised of the bent-over tree sapling tied with a plastic cord and a wire. His first response was to utter an alarm call, <wraa>, which quickly informed the other chimpanzees of his party about the existence of danger. He then employed a stick as a tool in an attempt to disable the trap. However, he was clearly afraid of approaching any closer to the unnaturally bent tree even though previous episodes have demonstrated that some older adult male chimpanzees will place pressure on the bent-over sapling to trigger the snare. In this case the wire snare and platform were very well camouflaged; YL's inability to precisely determine the location of the wire possibly compelled him to be more cautious and rely on a stick to disable the snare. Alternatively, it is also possible that YL was less experienced at the time than other older males of the community in deactivating snares and was therefore more fearful and more restrained in his approach.

In the previously observed episodes[12], males were not always successful in their attempts at disabling encountered snares. In the described case, YL used a stick to 'attack' the snare but it was too short to trigger the snare from a safe distance. YL was then disturbed and failed to potentially select another stick of sufficient length or break off a branch to make a longer tool to effectively accomplish the task.

Nevertheless, this episode clearly reveals that some of the chimpanzees within the Bossou community are clearly aware of the dangers posed by snares and that these inanimate objects need be destroyed, particularly to protect juveniles and infants, who may be naïve to snares' potential harmful consequences. We have never witnessed YL or any other chimpanzee since then use a stick to disable a snare. This behavior may represent an innovation which has not been transmitted possibly due to its inefficacy compared with simply deactivating snares by hand as typically recorded otherwise among a number of adult males of this community.

ACKNOWLEDGEMENTS

The field work of YS in 2005 was financed by a research grant of Tokai-Gakuen University. We are grateful to the Institut Nationale de la Recherche et Documentation de Guinée (INRDG) and the Direction Nationale de la Recherche Scientifique et Technologique (DNRST), Republique de Guinee, for their collaboration and providing us permission to conduct field work at Bossou since 1976. Dr. Vanessa Hayes kindly commented and revised the first version of this report.

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<NOTE>
A Chimpanzee Bed Found at Tubila, 20 km from Lilanshimba Habitat

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INTRODUCTION

Some unit-groups (communities) of chimpanzees (*Pan troglodytes*) have huge home ranges in the savanna woodland area of western Tanzania[1]. However, it is difficult to follow non-habituated chimpanzees to confirm their home range. Although chimpanzee beds show the distribution of chimpanzee habitats, researchers cannot estimate the home range of each unit-group based on the location of beds when the home ranges of several unit-groups overlap, unless, for example, the identities of the beds are examined by DNA analyses. If the unit-group has no neighboring group, however, researchers can use beds to estimate the home range of that unit group.

Here, we report the discovery of a chimpanzee bed at Tubila, which was considered to be outside chimpanzee habitat, and discuss home range use and possible gene flow of chimpanzees in the savanna woodland area.

RESULTS

Tubila is located in the Mkuti Forest Reserve (05°01′S, 30°06′E), 25 km north of the Malagarasi River, and 30 km southeast of Kigoma City (Figure 1). There are several patchy evergreen forests surrounded by deciduous miombo woodlands in Tubila. Anubis baboons (*Papio anubis*) and common duikers (*Sylvicapra grimmia*) inhabit Tubila, but there was no previous information indicating that chimpanzees inhabited the area before our finding.

When M. Mbalamwezi, a local research assistant for our savanna chimpanzee research project, passed Tubila on 25 February, 2008, in the rainy season, he found a chimpanzee bed in one of the evergreen forests. The bed was at a height of approximately 20 m, and was made in a 30 m *Julbernardia unijugata* or *Monopetalanthus richardsiae* tree (local name, Kabanba). The bed site was 500 m north of the main road connecting the cities of Kigoma and Uvinza. Most leaves in the bed were still green, indicating that only several weeks had passed since the bed was made. M. M. did not find any other chimpanzee traces such as hair or footprints around the bed.

M. M. and A. Alufuled, another research assistant, visited the site together on 10 March, 2009, and found that the framework of the bed remained in place. M. M. visited the place once again in May 2010 and found that the bed was gone. Furthermore, on 31 July 2010, M. M., H. Ogawa, and M. Yoshikawa visited the location and walked 4.5 km in and around the forest, but did not find any traces of chimpanzees.

DISCUSSION

The nearest chimpanzee habitat to Tubila is Lilanshimba, which is 20 km south of Tubila[2,3]. One of the chimpanzees from the Lilanshimba population might have temporarily come to Tubila and stayed one night there. It is possible that chimpanzees safely moved from Lilanshimba to Tubila, because riverine and patchy evergreen forests and savanna woodlands are distributed in the area alongside small villages and cultivated fields. The next nearest chimpanzee habitats are Kwitanga and Gombe National Park[4,5]. However, Kwitanga is 45 km north and Gombe is 60 km northwest of Tubila. Because the area between them is occupied by villages, cultivated fields, and bare hills now, it seems very difficult for Kwitanga and Gombe chimpanzees to cross that area. There was no information to indicate that a chimpanzee had been recently captured and released near Tubila. Therefore, the chimpanzee who made the bed at Tubila was most likely to be a member of the Lilanshimba population.

In the Lilanshimba area, 32–45 chimpanzees in one or two unit-groups inhabited a 316 km^2 area (0.10–0.14 bed-building individuals/km^2) in 1995[2]. However, Congolese refugee camps were built there in 1997, and their activities seriously damaged the chimpanzees and their habitat. As a result, only a few chimpanzees remained in a 175 km^2 area (0.02 individuals/km^2) in 2006[3]. Although H. O. and M.

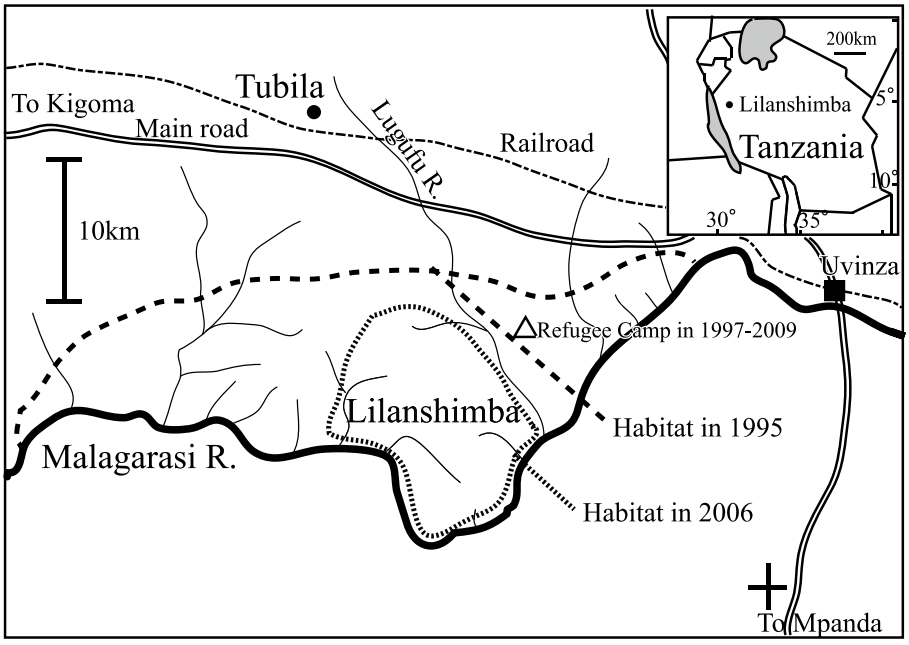

Figure 1. Locations of Tubila and Lilanshimba.

Y. confirmed that chimpanzees were surviving in the area when chimpanzees were heard during a stay between 16 and 20 August, 2007, the local population in Lilanshimba was facing extermination. After the Congolese refugees left the refugee camps in 2009, however, local people near Lilanshimba said that the original vegetation gradually began to recover, and some wild animals returned to the area.

If the hypothesis that a Lilanshimba chimpanzee made its way to Tubila is correct, the chimpanzee moved at least 15 km from the north edge of the original habitat. In addition, the 25 km distance between the bed and the south edge of the original home range shows that chimpanzees may have a huge annual home range in the savanna woodland area.

One of the longest records of one day movement by a chimpanzee is 10.7 km at Gombe[5]. The chimpanzee at Tubila may not have walked 15 km in one day, as there are many places in which a chimpanzee could have slept between Lilanshimba and Tubila. Food scarcity might have promoted the long-range movement, because deforestation by Congolese refugees reduced feeding trees, and because fewer ripe fruits occur during the rainy season than during the dry season (Yoshikawa, unpublished data). It is not surprising that only one bed was found, because chimpanzees disperse into small parties during the rainy season in this area.

On the other hand, however, the chimpanzee at Tubila might have been in progress of possible transfer to another unit-group, although sex of the chimpanzee is unknown. Such long-distance dispersal may still be occurring, potentially producing gene flow between isolated populations in the savanna woodland area, western Tanzania.

ACKNOWLEDGMENTS

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<NOTE>
Mahale Chimpanzees Start to Eat Oil Palm

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INTRODUCTION

The oil palm (*Elaeis guineensis*) is a cultural food of wild chimpanzees[1]. The Gombe chimpanzees in Tanzania eat the pericarp of its fruit, the pith of its fronds, its flowers, and its wood[2]. The Bossou chimpanzees in Guinea eat its pericarp, the base of its fronds, and its wood as well as its nut kernel (accessing it using stone hammers and anvils)[3] and its apical meristem (by pounding it with a pestle-like leaf-petiole)[4]. In contrast, the Semliki chimpanzees in Uganda appear not to eat any part of the oil palm[5]. Researchers have observed the Mahale chimpanzees in Tanzania since the 1960s and have not observed these chimpanzees eating any part of the oil palm[6,7], but in 2010 they started to eat the pith of the oil palm. This paper presents two observations of oil palm eating and discusses the triggers for this behavior.

METHODS

We studied the chimpanzees in Mahale Mountains National Park, Tanzania[8], from July 7 to December 4, 2010 (MN), and from December 5, 2010, to January 18, 2011 (KZ). AR supported MN and KZ as a field assistant. We observed M group chimpanzees (total observation time of MN is 410.9 hr and that of KZ is 184.5 hr) but were not focused specifically on oil palm-eating behavior. We used the *ad libitum* sampling method[9] when chimpanzees were eating parts of the oil palm.

OBSERVATIONS

Case 1

On August 23, 2010, MN and AR followed Darwin, an adult male, who joined a party with 15 individuals. At 09:56, some chimpanzees fought in a bush, and at 10:22, Darwin walked from the bush to an observation trail. MN and AR followed him, and AR cut a frond of oil palm that was in the way with a machete.

At 10:25, Mitsue, a 9-year-old female, and Michio, a 14-year-old male and a brother of Mitsue, came from the bush to the observation trail. Michio started to groom Darwin, and Mitsue picked up the cut frond and transported it on her back (Figure 1). The frond was 160 cm long and was cut at one end. At 10:27, Mitsue lay down on the frond, and then broke the stem of the frond, stripped the rind from the frond with her teeth and hand, split the pith of the frond, and chewed the pith (Figure 2). At 10:31, Mitsue was still chewing the wadge, but Darwin and Michio did not appear to be interested in her behavior. At 10:36, she split the pith again and chewed it for about 40

Figure 1. Mitsue transports an oil palm frond cut by a human.

Figure 2. Mitsue lies down on the oil palm frond and chews its pith.

Figure 3. CY08 (right) takes a piece of oil palm frond pith. Mitsue (left) keeps the oil palm frond.

seconds. Then she lay down on the ground.

At 10:40, Mitsue got up and transported the frond on her back. Then she placed it on her neck, walked about 2 m, and sat on the ground hugging it. At 10:48, Darwin, Michio, and Mitsue moved and left the remaining frond on the ground.

Case 2

On January 15, 2011, KZ and AR observed a party consisting of 10 chimpanzees including Mitsue (four adult females, one adult male, one young female, one young male, two infant females, and one infant male). Four tourists with a park ranger and a tourist guide were also watching them. At 10:43, another two tourists with a park ranger and a tourist guide appeared after the preceding tourist group left. After 20 minutes, the park ranger cut several mature oil-palm fronds with a machete to make way for the approaching chimpanzees.

At 11:17, Mitsue picked up and transported a piece of the frond cut by the ranger. The piece was 90 cm long and was cut at both ends. Mitsue sat on the ground and licked the end that was wet with sap. At 11:26, she stripped the rind from the frond with her teeth and hand, split its pith, and chewed the pith. Two infant females, Lilim (three years old) and CY08 (two years old), approached and watched Mitsue chewing the wadge of pith. At 11:29, Lilim started to split the pith of the frond held by Mitsue. Mitsue continued chewing her wadge and allowed Lilim to take it, but CY08 snatched the fragment of pith split by Lilim (Figure 3). CY08 climbed a tree, put the pith into her mouth, and chewed it. At 11:30, Mitsue split the pith again and chewed it. Lilim approached Mitsue and tried to take the pith from her again, but Mitsue would not allow her to take it.

At 11:33, the party left the area and the wadge remained on the ground (Figure 4). KZ tasted another piece of frond cut from the same area; it was insipid.

DISCUSSION

Local people living near Mahale eat some parts of the oil palm. They make cooking oil from the pericarp, make alcohol from the tree's sap, and eat the kernel of the oil palm. The local people use stone hammers and anvils, and these tools with cracked nuts and kernels, which were used by local people, were observed in the home range of the M group of chimpanzees in 2000 (KZ personal observation, Figure 5) and in 1996 (W. C. McGrew personal communication). The pericarp is also eaten by yellow baboons (*Papio cynocephalus*) and red-tailed monkeys (*Cercopithecus ascanius*), which are common diurnal monkeys in Mahale. Thus, the oil palms in Mahale are edible, and the Mahale chimpanzees have the opportunity to learn to eat parts of the oil palm from other species, but they have not previously been observed doing so.

No animals or humans in the Mahale Mountains have been observed eating the pith of the oil palm, so Mitsue may be a pioneer. Chimpanzees in Gombe and Bossou have been observed eating the pith of the oil-palm frond, but they used a different feeding technique than that used by the Mahale chimpanzees. The Bossou chimpanzees pull or break a young soft frond from and eat its base on

Figure 4. Wadge remained on the ground.

Figure 5. A stone hammer and anvil used by local people in the home range of the M-group. Cracked nuts and the kernels are scattered around the anvil. This picture was taken in 2000.

the top of oil palm tree or on the ground (G. Ohashi personal communication). The Gombe chimpanzees also eat young fronds using their hands and mouth (S. Kamenya personal communication). In contrast, the Mahale chimpanzees do not climb the oil palm tree or pull out fronds. Mitsue was observed picking up fronds from the ground after they were cut by humans; neither Gombe or Bossou chimpanzees have been observed eating the pith of a frond cut by a human (S. Kamenya and G. Ohashi personal communication).

Table 1. Items transported by Mitsue during 18 days of observation from December 5, 2010, to January 18, 2011.

Item	Edible	N
Fruit of *Pycnanthus angolensis*	Y	1
Fruit of *Saba comorensis*	Y	1
Pod of *Parkia filicoidea*	Y	1
Stem of *Ampelocissus cavicaulis* vine	Y	3
Stem of *Cissus oliveri* vine	N	1
Herb	N	1
Branch	N	1
Branch of *Lecaniodiscus fraxinifolius*	N	1
Fragment of deadwood	N	1
Piece of bark	N	1
Feather of Guineafowl (*Guttera pucherani*)[10]	N	1
Frond of oil palm	*	1
Total		**14**

*: case 2

It is remarkable that human activity inspired chimpanzees to try a new food item even though it was unintentional. People working in Mahale must cut many plants that are in the way, but chimpanzees do not pay particular attention to most cut plants even when they are edible. Mitsue was unusually curious especially about objects and picked up various items from the ground regardless of whether they were edible (Table 1). The cut frond might have just been one of these items to transport, and she may have discovered incidentally that it was edible.

A cut frond of an oil palm is uninteresting to most of chimpanzees, but after Mitsue began to pay attention to it, infant females also started to take notice of it. Most of novel behavioral patterns have not spread to many other individuals[7], so it is difficult to predict whether this novel food item will become a cultural food for the Mahale chimpanzees. A follow-up survey will be required.

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<NOTE>
Immigration of a Large Number of Adolescent Female Chimpanzees into the Mahale M Group

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INTRODUCTION

Female chimpanzees usually transfer between unit-groups on reaching sexual maturity[1]. All chimpanzees in the Mahale M group have been identified since 1980[2]. Following this date, the maximum number of normal adolescent female immigrations into the M group was 3 per year (Ref. 2, Table 1). Larger number of immigrants was only observed when several adult females transferred into the M group in the course of the K group extinction[2]. However, in 2010, an extraordinarily large number of adolescent females transferred into the M group. Thus, we report here the episodes that occurred when we first observed these females. We also discuss the possible reasons why such a large number of immigrations occurred.

OBSERVATIONS

In 2010, 5 adolescent females immigrated into the

M group. This number is extraordinarily large compared to the annual level of immigration over the last 20 years (Table 1). The 5 chimpanzees were named after completing recognition of their faces and characteristics (Figure 1).

Table 1. Annual number of newly immigrated adolescent females into the M group between 1991 and 2010. The possible immigration of orphans was excluded here. All data came from the long-term data shared by the Mahale Mountains Chimpanzee Research Project. *This study.

Year	91	92	93	94	95	96	97	98	99	00
No. immigrants	1	1	3	2	0	0	2	1	0	0
Year	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**
No. immigrants	1	1	1	0	1	2	0	1	0	5*

The first immigrant, Yuna, was first observed by Nakamura in the northern part of the M group's range at about noon on January 11, 2010. Yuna's sexual skin showed full swelling. She was groomed by an adolescent female, Xantip. Half an hour later, the party, including Yuna, moved further north, and observations ceased for the remainder of that day. Since then, Yuna has remained in the M group.

The second immigrant, Hadija, was first observed for 2 hours by Nakamura in the southeastern part of the M group's range at about noon on June 23, 2010. Hadija's sexual skin showed full swelling. She was groomed by the first immigrant, Yuna, one of the oldest adult females, Calliope, 3 adult males, Fanana, Pimu, and Orion, and an adolescent male, Christmas. She only reciprocally groomed Orion in the form of mutual grooming, and then copulated with him. She also copulated with the oldest male, Kalunde. She was observed on occasion in June and July, but disappeared after a sighting on August 5, 2010.

The third immigrant, Juju, was first observed by Nakashima in the middle of the M group's range at about 5 p.m. on September 4, 2010. Juju's sexual skin was not swelling much. She was sitting on a tree with 2 adolescent females, Xantip and Puffy, and a juvenile female, Zuhura. When an adult female, Gwekulo, climbed the tree, the 3 young females threatened Juju, and Juju screamed. The fuss caused charges by nearby males, while Gwekulo and the other resident females left the site. Since Nakashima was following Gwekulo on that day, the observation of Juju was terminated. An hour later, Juju was found again in a tree. An adult male, Primus, came and sat near her. Then, the alpha male, Pimu, climbed the tree excitedly, chased Primus, and beat Juju. Subsequently, Juju copulated with an adult male, Orion, and then Orion and an adolescent male, Christmas, simultaneously groomed her. When Primus rushed to the site, Orion immediately left, but Christmas beat Juju. Overall, she was groomed by Primus, Orion, and Christmas, but she groomed only Yuna.

The fourth immigrant, Badiri, was first observed by Hayakawa in the middle of the M group's range at about noon on November 15, 2010. Badiri's sexual skin showed full swelling. When Hayakawa followed a juvenile male, Teddy, who was walking alone, Badiri was found accompanying the first immigrant, Yuna. Badiri left the location when Teddy (and Hayakawa) came closer. On the morning of November 30, 2010, Hayakawa followed Badiri, whose skin was not swelling much. When Badiri approached a small party, which consisted of 2 adult females, Omo and Ua, 2 adolescent males, Caesar and Emory, and Teddy, she was attacked by Ua. Badiri screamed touching her left nipple with the right hand. She continued to touch in this manner for several tens of seconds, although she became quiet on the way. Afterwards, she was again seen to touch her left nipple with the right hand for 10 seconds while pant-hooting. An hour later, when she was travelling alone, she was threatened by an adolescent female, Xantip.

The fifth immigrant, Rajua, was first observed by Hayakawa in the middle of the M group's range on the morning of December 3, 2010. Rajua's sexual skin was not swelling much. She was sitting on a tree close to a bed where 2 former immigrants, Juju and Badiri, were sitting, while a few males were on the ground beneath. About 30 minutes later, the 3 immigrants were attacked by resident adult females and dispersed. Subsequently, Hayakawa followed Calliope. At 3 p.m., Calliope was eating the fruit of *Saba comorensis*, and the 3 immigrants came closer and ate the same type of fruit, nearby. Twenty minutes later, the 3 immigrants groomed Calliope. Juju and Badiri groomed Calliope's back, while Rajua groomed Calliope's back and right leg. During grooming, an adult male, Alofu, came beneath the tree. Juju and Badiri approached Alofu once, but returned quickly. An hour later, Calliope left alone. Although Calliope was followed and observed until 7 p.m., she did not meet any immigrants again on that day.

Among the 5 immigrants in 2010, 4 remained in the M group for at least a few months, but Hadija has not been observed again.

Figure 1. Immigrants in 2010, and the months of first observation. Photos by T. Hayakawa (Yuna and Badiri), M. Nakamura (Hadija), and S. Inoue (Juju and Rajua).

DISCUSSION

Previous studies indicate that newly immigrated females are received in a friendly manner by males but with hostility by resident females[3].

Our observations of grooming and copulation with males and attacks by females were concordant with this notion. However, we also recorded attacks by males and friendly behaviors with resident females. It should also be noted that we observed affinitive relationships among the immigrants. Hadija, Juju, and Badiri were accompanied by Yuna when first observed. Moreover, Juju, Badiri, and Rajua fed with and groomed Calliope simultaneously. One possibility is that these immigrants identified one another as just migrating into the M group, and thus readily associated. Another possibility is that all or almost all of them had immigrated from the same natal group, and thus already knew one another. However, since the M group is the only currently habituated unit-group at Mahale, it is difficult to determine more about the natal group(s) of them.

The M group once received many immigrants in the course of the K group extinction[4]. The unusually large number of immigrants in 2010 might also be a result of similar extinction of a nearby unit-group. However, it is premature to conclude this, because at the time of the K group extinction, not only adolescents but also up to 6 parous adult females per year immigrated into the M group[2]. If group extinction is the case, the M group should also receive many adult females in the near future.

Female immigration contributes to behavioral variations of the unit-group, which may or may not be directly connected with genetic variations. In this respect, it is interesting that Badiri pressed her nipple in an apparently habitual fashion. This behavior is known as "nipple press," which only a certain portion of Mahale chimpanzees do[5], although the mechanism for this behavioral variation has not been investigated in detail. Immigrants often have idiosyncratic habits, which are likely to be customs of their natal groups[6,7]. Therefore, it is interesting to see how these immigrants and their different behavioral customs will cope with the existing M group customs.

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<NEWS>
Bush Fire Control Using Arbors in Green Corridor Project at Bossou

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A group of chimpanzees live near Bossou in Guinea, West Africa. Bossou is a village located west of the Nimba Mountains, the only World Natural Heritage site (UNESCO/MAB) in Guinea. Bossou chimpanzees are well known to use a variety of different tools that have been studied in details over the past 35 years[1]. The number of chimpanzees in Bossou community are stable, counting 19 individuals on average (range: 16–22) from 1976 to 2003, but we have lost five chimpanzees due to flu-like epidemic in November 2003[2,3]. The number of Bossou chimpanzees are now 12, stabilized over the past three years. No female chimpanzees immigrated since the beginning of field study. The Green Corridor Project[4], a tree plantation effort has begun in 1997 as a 4 km long expanse across the savanna area separating Bossou from Nimba Mountains[5,6]. The project is expected to promote individual interchange between the Bossou and Nimba groups as part of the conservation effort of wild chimpanzees.

Since our initial efforts 8 years ago, some forest tree species, such as *Uapaca heudelotii*, have survived well when planted in the savanna[7]. We have also piloted a work of sapling nursery using chimpanzees' feces. Saplings grown from feces secreted by chimpanzees, commonly known as seed dispersal, were planted in savanna. Naturally, the germinating rate of seeds increases, when seeds pass through the intestine of a chimpanzee. We applied seed dispersion in natural ecosystem into a plantation. We have taken care of saplings in a tree nursery with sufficient humidity and filtered sunlight. After the saplings grown up to over 50 cm high, we have transported them into the savanna. Unfortunately, the saplings were exposed to strong sunshine in the savanna, and then some of them died within a few days. To protect the fragile saplings, we have planted them in manioc field or covered

Figure 1. Local workers in Bossou take care of arbors in the corridor.

Figure 2. Bush fire expanded again into the corridor area on February 7th, 2011.

the saplings by HEXATUBE (Phytoculture Control corp.) to reach better success rate. With this effort, we managed to protect saplings from drought and strong sunshine in savanna.

We found that young trees should be grown under similar condition as the nursery condition after transportation to the savanna. We have set out arbors to cover saplings to minimize damage caused by solar insolation in the savanna. The arbors that are about 1.8 m in height were constructed from natural materials such as bamboos as columns, leaf stalks of Raffia as beams, and palm leaves as roof. The arbors provide shadow over the sapling during strong sunshine, while the arbors mold gradually as days go by. We began this new protocol employing three arbors and transplanted 25 *Uapaca heudelotti* saplings under each of them (*i.e.*, 75 saplings in total) in 2007[8]. We have constructed 23 arbors until September 2008.

Moreover, we set a 10-m-wide and 4-km-long firebreak gap area by removing dry vegetation as a corridor system, because the arbors are highly susceptible to bush fire, especially in dry season. Local people at Bossou and Seringbara patrolled and took care of the corridor area (Figure 1). However, bush fire occurred outside of the corridor expended and burned 11 out of 23 arbors on January 20th, 2009. Fortunately we have managed to recover up to 27 arbors in the corridor, after the bushfire. We also cut the grass intensively in the area of 3 to 5 m around arbors and at maintenance pass in dry season, from January until March 2011.

On February 7th, 2011, bush fire entered into the corridor again by skipping a 10-m-wide firebreak due to strong wind (Figure 2). A post-survey estimated that the fire burned about one-third of the corridor area. At the same time, the survey found that the arbors in the corridor had no damage at all from the fire. The bush fire surrounded eight arbors at least, and then stopped besides them. The reason is that the grass was cut in the corridor. We had also taken away all dried grass and dead woods around arbors before the bush fire occurred. Even if fire intensified when windy, the wind passed over a few lying dry materials on the ground around arbors, preventing blaze. As the result showed, the fire got weak and stopped in front of the arbors. Green patches of young trees at arbors looked like islands on burnt remains of savanna (Figure 3).

Our experience proved that the arbors with sufficient care played a similar role as the firebreak. The bush fire stopped at the line of the arbors and passed over them. While a 10-m-wide firebreak is effective to prevent direct expansion of bush fire to reach the corridor, it is also difficult to sweep dry material through long distances in order to keep the firebreak clean from debris. It is not very realistic to prevent getting the bush fire into the corridor completely, but it should be controlled to minimize damage to young trees and arbors. Daily care of cutting the grass is necessary to keep the lookout on all the areas surrounding arbors and/or planted trees sufficiently. The more we construct and take care of the arbors with sufficient care, such as cutting the grass, the corridor area will have more resistance to the bush fire.

Saplings can grow up in savanna. Some of young trees became over 4 m high after removing arbors. Once the roots of the saplings deeply inside the ground, they grow up to be a young tree, an arbor is no longer necessary for the tree to survive under such severe conditions in the savanna. Grown trees shadow other saplings beneath them, which takes more time to grow under the

Figure 3. The post-survey found that the bush fire stopped at a line of arbors and at its maintenance pass with sufficient care of cutting the grass.

filtered sunlight. When the height of young trees reaches the roof of the arbors, we take away all molded remains of columns, beams, and roof. Those natural materials are possibly sustainable resources in a course of natural ecosystem. In 2011, we have a plan to plant 20,000 saplings in to the corridors with the support by Toyota Foundation. Green Corridor Project has entered into a new phase by introducing the arbors procedure in larger scale of our tree plantation.

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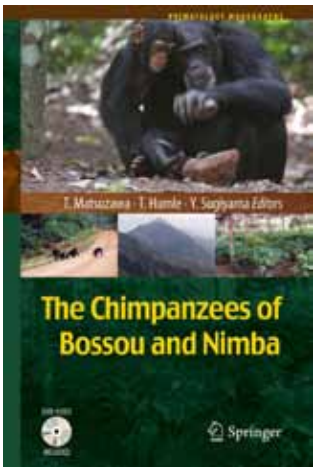
Edited by Tetsuro Matsuzawa, Tatyana Humle & Yukimaru Sugiyama

The Chimpanzees of Bossou and Nimba



The chimpanzees of Bossou in Guinea, West Africa, form a unique community which displays an exceptional array of tool use behaviors and behavioral adaptations to coexistence with humans. This community of *Pan troglodytes verus* has contributed more than three decades of data to the field of cultural primatology, especially chimpanzees' flexible use of stones to crack open nuts and of perishable tools during foraging activities. The book highlights the special contribution of the long-term research at Bossou and more recent studies in surrounding areas, particularly in the Nimba Mountains and the forest of Diécké, to our understanding of wild chimpanzees' tool use, cognitive development, lithic technology and culture. This compilation of research principally strives to uncover the complexity of the mind and behavioral flexibility of our closest living relatives. This work also reveals the necessity for ongoing efforts to conserve chimpanzees in the region. Chimpanzees have shed more light on our evolutionary origins than any other extant species in the world, yet their numbers in the wild are rapidly declining. In that sense, the Bossou chimpanzees and their neighbors clearly embody an invaluable cultural heritage for humanity as a whole.

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