

Understanding the integration process of captive chimpanzees *Pan troglodytes* in the Uganda Wildlife Education Centre*

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Abstract Over a period of 30 years between 1967 and 1997, the population of wild chimpanzees *Pan troglodytes* in their natural habitats of tropical Africa has declined from 600 000 to less than 200 000 and is still declining thus raising global concern and a great need for their *ex situ* conservation. In the wild, chimpanzees live in communities and this is mimicked in captivity. For *ex situ* conservation of wild chimpanzees to be effective, efforts should be made to ensure acceptance of newly introduced individuals by those chimpanzees already living in zoo communities. This study was first conducted at the Uganda Wildlife Education Centre (UWEC) from October 2004 to March 2005 and additional information was gathered between September 2006 and January 2007 in order to understand their integration process. Five chimpanzees were observed and data were collected concerning their feeding habits, behavior, weight changes and health status. Direct observations, recorded information and participatory discussions with veterinary doctors and UWEC managers provided additional information about captive chimpanzees. From our findings, wild chimpanzees had more diseases than captive ones which in turn affected their feeding, social behavior and activity levels. Our results also show that understanding the integration process of captive chimpanzees is essential for both *ex situ* and *in situ* conservation because captive chimpanzees though given much attention, they still reflect some behavior of the wild ones [Acta Zoologica Sinica 53 (3): 399–407, 2007].

Key words Chimpanzees, *Pan troglodytes*, Conservation, *ex situ*, *in situ*, Integration, Origin, UWEC

乌干达野生动物研究中心外来黑猩猩融入笼养群体的过程*

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摘要 1967至1997的30年间,生活在非洲热带地区自然栖息地的野生黑猩猩数量由60万降至不足20万,至今这个数字仍在减少,因此引起了全球的关注并急需开展迁地保护。笼养黑猩猩与野外种群一样营群居生活,为了有效进行野生黑猩猩的迁地保护,将野外捕获的野生黑猩猩个体成功引入已在动物园的黑猩猩群体中十分必要。2004年10月至2005年3月,乌干达野生动物研究中心首先开展了这一实验。同时为更好地了解外来黑猩猩融入笼养群体的过程,2006年9月至2007年1月间收集其活动数据。选取5只黑猩猩个体并记录它们的食性、行为、体重变化及身体健康状况。除直接观察和记录外,与兽医和研究中心管理人员进行合作,以获取较多笼养个体的信息。我们发现,野生个体比笼养个体多病,因此影响了它们的取食、社会行为及活动水平。尽管笼养黑猩猩有人照料,但仍具备野生个体的行为,所以,理解外来黑猩猩融入笼养群体的过程对于黑猩猩的迁地保护和就地保护是非常重要的[动物学报53(3):399–407,2007]。

关键词 黑猩猩 保护 迁地保护 就地保护 融入 起源 乌干达野生动物研究中心

Recent global ecological debates and conservation activities have centered on endangered species (e. g. Reeve, 2002). IUCN lists chimpanzees *Pan troglodytes*

in its red data book of endangered species (IUCN, 2000). The major cause of danger to the species is habitat degradation mainly due to human activities

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(Struhsaker, 1997; Caspary, 2001). Different options have been proposed to save the remaining chimpanzee populations including *ex situ* conservation mainly in zoos. Conservation of chimpanzees is critical and the importance of chimpanzee survival cannot be overemphasized by conservationists and ecologists. Chimpanzees are among the world's great apes and share about 98.6% of human genes making them man's closest living relative (Kingdom, 1971; Huffman, 1997). Wild chimpanzees are only found in tropical Africa, where their populations have declined by more than 66% between 1967 and 1997, from about 600 000 to less than 200 000 individuals (Reynolds and Reynolds, 1965; Kingdom, 1971; 1997).

All the four sub-species of chimpanzees in the wild are found in Africa and are listed as endangered (Kingdom, 1997). Although chimpanzees are protected by international legislation, (CITES), in many countries, they are poached and traded. It is estimated that between 1994 and 1996, 3 000 to 6 000 apes were either killed or illegally exported (Rose, 1998). Rising concern about the declining wild chimpanzee populations has promoted captivity as an alternative conservation measure to save the species. Three main problems have led to captivity of chimpanzees: habitat degradation, human threat, and commercial exploitation (Rose, 1998). In addition, intrinsic factors like late onset of sexual maturity and low fecundity threaten the wild populations (Wallis, 1995). The chimpanzee population in Uganda is estimated to be 4 980 in 2006 down from over 12 000 in 1960 (Reynolds and Reynolds, 1965; Plumptre and Cox, 2006; Tweheyo et al., 2006). In a conservation drive, UWEC decided to adopt more captive chimpanzees and also supports those kept at Ngamba Island in Lake Victoria in order to increase the protection of the species. This study focused on the chimpanzees at the education center because it is the entry point for all captive chimpanzees in Uganda. Presently, UWEC has a population of eight chimpanzees at the zoo (Zakaayo, Aluma, Matooke, Onapa and Shaka who are males and Amina, Ruth and Pearl who are females). Apart from Shaka that is captive born, the rest were trans-located from the wild. At the time of introduction into the zoo, Zakaayo, Aluma, Matoke, and Onapa were eight, four, eight, and two years old respectively while Amina, Ruth, and Pearl were five, five, and three years respectively. The trans-location and integration process presents a challenge that directly or indirectly translates in a conservation and ecological concern because wild chimpanzees have a host diseases which may be of greater danger to the zoo communities. The adopted chimpanzees are brought from different forests and therefore need to be integrated with the existing population at UWEC in order to form a social community. The objective of this study therefore was to analyze the processes and challenges of community formation of

captive chimpanzees at UWEC; a process known as integration. Elsewhere, reports have shown that newly introduced chimpanzees may either be killed, or temporarily rejected by certain members (Nishida and Uehara, 1983). Given that chimpanzees are endangered species and their conservation critical, understanding the captive integration process is essential to the managers and conservationists. This is because: (1) the species is endangered and; (2) the captive chimpanzees may be reintroduced back to the habitats of origin. Thus conservationist should be kept aware of the status of both wild and captive chimpanzees; and captive records in terms of natural history should be maintained as a future guarantee for both research and conservation activities. In Uganda, emphasis is put on the wild species and yet little scientific analysis has been done on captive chimpanzees. This study therefore, has brought part of the captive chimpanzee information in Uganda to international attention and promotes the contribution of wildlife centers such as UWEC. This is particularly important because most developed zoos are found in non-primate habitat countries and our work will increase understanding of primate habitats and promote their conservation.

1 Materials and methods

1.1 Study area

The Uganda Wildlife Education Center (UWEC) is located in Entebbe, 35 km south of Uganda's capital city Kampala, on the northern edge of Lake Victoria at an altitude of about 1 100 meters above sea level. Chimpanzees occupy about one hectare of the 33 ha of the Centre; a forested island which accords them both wetland and rainforest habitat conditions. At UWEC, newly introduced chimpanzees are first quarantined to ascertain their health statuses and get them acquainted to their caretakers. They are then released to the exhibit where the other animals are kept. Direct contact with the older chimpanzees is avoided, and interactions at this stage are restricted to visual and olfactory contact between the animals. The chimpanzees are only allowed hand contact by the barrier that separates the new from the old.

1.2 History, sex and age at the time of introduction

At UWEC, the moment a chimpanzee enters the zoo it is given a name. Aluma, our focal animal is recorded to have originated from the tropical forests of the Democratic Republic of Congo. Onapa was brought from Muntene forest patch in Hoima District, Uganda. Matoke was brought from Kilembe mines in Western Uganda. He is suspected to originate from the tropical forests of the Democratic Republic of Congo and was brought into Uganda by illegal dealers. He was first protected at Mweya in the Queen Elizabeth National Park before relocation to UWEC. Pearl was found in a farmer's garden by children in Butokoma, Kasese district, Western Uganda. Shaka who acted as a control was born at

UWEC. Data were not available for other three chimpanzees at the zoo and this need to be collected in

future. More information about the individual animals is shown in Table 1.

Table 1 Rearing histories of the studied individual chimpanzees at UWEC

Name	Sex	Background	Age (years) at the time of introduction	Current age in years	Time of arrival at UWEC
Aluma	Male	Wild born	4	7	November 2003
Onapa	Male	Wild born	2	5	August 2003
Matoke	Male	Wild born	8	12	June 2002
Pearl	Female	Wild born	3	6	June 2003
Shaka	Male	Captive born	-	4	Born in March 2003

1.3 Sampling procedures and data collection

Five individuals out of a community of eight chimpanzees were studied and these are Aluma, Onapa, Matoke, Pearl and Shaka. Aluma was the focal animal and data on him were collected between October 2004 and March 2005, the rest of data were recorded by UWEC staff and additional management data were collected between September 2006 and January 2007. This was because one person needs a minimum of six months to study one single chimpanzee. Aluma, our focal individual had only been at UWEC for two days before data collection begun. This gave us an opportunity to carry out the initial primary data on Aluma ourselves. The information recorded about him was compared with that of Matoke, Pearl, Shaka, and Onapa that were integrated by UWEC staff members. Shaka who is the only captive born individual was used as a control individual.

Data included habitats of chimpanzee origin, age at time of introduction, body weight changes, diseases treated at introduction, behavior and feeding habits for each chimpanzee. These were recorded for the time the chimpanzee spent at the veterinary unit and the exhibit.

1.4 Veterinary unit

Chimpanzees newly introduced into the zoo are first taken to the veterinary unit where they are quarantined. This is essentially for medical examination and treatment. The chimpanzees also get acquainted to the animal handlers while at this unit. At any given time, there is only one chimpanzee at the veterinary unit. In the veterinary unit, we recorded the diseases and feeding conditions of the chimpanzee.

1.5 Feeding characteristics of chimpanzees

Feeding characteristics were categorized as poor appetite (PA), feeding well (FW), not feeding well (NFW) and improved feeding (IF). These parameters were defined as follows: (i) PA was when less than half the food provided was eaten; (ii) FW was when all food provided was eaten; (iii) NFW was when after complete treatment of a disease, the chimpanzee was expected to eat more food. However, sometimes the chimpanzee ate the same quantity as at the time of sickness for more than two weeks; and (iv) IF was when the chimpanzee

remained as described in the latter state for a period of one month but later ate more food, the period there after was described as improved feeding.

1.6 Diseases suffered and body weight changes

We discussed with the veterinary doctors and documented the diseases suffered by the studied animals. We carefully recorded on a daily basis all the diseases and health conditions of chimpanzees from the time they were introduced from the wild. We also tabulated and analyzed the weights of the chimpanzees which were measured by UWEC staff after every two months using ordinary weighing scales.

1.7 Behavior of chimpanzee

We recorded the behavior of chimpanzees at UWEC in terms of their social activities. The activity of the animal was dependent on the degree of interaction between the chimpanzee and its keepers. Activities were classified as: (i) Very active (VA) if interaction with keeper was more than six continuous hours; (ii) Active (A) if interaction with keeper was between four to six hours; (iii) Inactive (I) if interaction with keeper was less than four hours; and (iv) recovering activity (RA) if the animal that was considered inactive increased on interaction time with keeper from less than 30 minutes to more than two hours.

1.8 Recording food intake and behavior

The feeding rate of chimpanzees was observed between 08:00 hours and 18:00 hours daily and the feeding rate recorded after every 15 minutes interval. The time interval taken by every chimpanzee to pick food from the time it entered the zoo to the present was recorded. For us, we consistently recorded Aluma for six months between October 2004 and March 2005 but information on feeding for other chimpanzees is available at UWEC; in addition, we revisited UWEC to collect more feeding and behavior information between September 2006 and January 2007. During this time, with the help of zoo assistants, once a week, we recorded every chimpanzees' feeding and social behavior for four hours between 08:00 and 13:00 hours in order to estimate the changes that comes with time as the individual gets used to captivity. The number and type of food consumed were counted and

divided by the time taken to pick and chew the food, in order to obtain the feeding rate per minute. We compared this feeding rate with body size, time chimpanzees have spent in the zoo and wild chimpanzees in order to correlate chimpanzee feeding variations with time. Between October 2004 and March 2005, the behavior and feeding characteristics of chimpanzees were recorded daily, six days a week from Monday to Saturday between 08:00 and 18:00 hours. In total we had 14:40 hours of field observations between October 2004 and March 2005 and 640 hours between September 2006 and January 2007. Data on other chimpanzees were recorded using the same method and was accessed through the zoo managers and scientists.

1.9 Data analysis

The data were analysed in SPSS version 8.0 (1997). Least square means of the factors were subjected to pair-wise comparisons using Least Significant Difference (LSD) and accepted at $P < 0.05$. In order to assess variations in frequency of different chimpanzee ages and weight with diseases suffered and feeding characteristics with time after introduction into the zoo, generalized linear model (GLM) (McCullagh and Nelder, 1989) using the GENMOD procedure in SAS version 8.0 (SAS, 1999a) was conducted. The significance of the explanatory variables was assessed by their likelihood ratio statistics (Chi-square distributed) and performed by SAS (1999b) and accepted at $P < 0.05$. The extent to which

diseases, feeding characteristics, age, and weight were related was analysed using Pearson correlation coefficient (r).

2 Results

2.1 Relationship between habitat of origin and chimpanzee body weight

The weight of all the chimpanzees has increased since their arrival at UWEC (Table 2). This is based on comparison with studies of wild chimpanzees of the same age e.g. in Mahale forest Tanzania (e.g. Nishida et al., 1990). However, at UWEC, the rate of weight gain reduced with increase in age in male chimpanzees (Fig.1). This was indicated by weight changes with advance in age shown by Matoke and Shaka. Overall, Pearl gained weight faster than males. Analysis of the relative weight gain showed that in general, weight increased with age (Table 2). With the exception of Matoke, all other chimpanzees showed an increase in relative weight gain over the period 2003 to 2004; Pearl still had the highest relative weight gain (Table 2). Shaka the captive born when compared with Pearl and Onapa at age three years, weighed ten kilogrammes while Pearl and Onapa weighed six and three respectively (Table 2). This was attributed to the fact that Shaka was readily accepted by the existing social group as their own and fed him diligently.

Table 2 Weight gain of the chimpanzees with the years of introduction into the zoo

Chimpanzee	Age	Weights for each year(kg)				Average weight gain(kg)	Relative weight gains each year(kg)	
		2002	2003	2004	2005		03/04	03/05
Aluma	4	-	8	9	11	1	0.25	1
Onapa	2	-	-	3	6	1.5	-	1.5
Matoke	8	20	22	25	25	1.5	0.75	0.5
Pearl	3	-	6	12	16	3.3	1.5	2
Shaka	1	-	4	8	10	2	1	1

Aluma, Pearl and Onapa were introduced to UWEC in 2003 thus missing weight records for 2002. Onapa on the other hand has missing results for 2003 as well because his weight records were not taken by the staff members. Shaka was born at UWEC in 2003 and therefore has no weight records for 2002.

2.2 Time spent in veterinary unit and feeding habits of the chimpanzees

There was a positive correlation ($r = 0.4$; Pearson's correlation coefficient) between the feeding habits and the time spent treating the animal in the veterinary unit. This was attributed to treatment of all diseases they had while in the wild. Because of these diseases, the chimpanzees tended to have poor appetite on entrance into the veterinary unit. However, on treatment the chimpanzees gained appetite and their feeding characteristics improved (Fig.2). The rate of feeding per minute increased with time spent by chimpanzee in the zoo from an average of seven hand picks per feeding bout when the chimpanzees entered the zoo from the wild to an average of 17 hand

picks per feeding bout after two years. When compared with the Budongo chimpanzees of similar age (Tweheyo and Obua, 2001), at three months in the veterinary unit, the UWEC chimpanzees took in more food per minute but in both the wild and captivity, the rate of food intake was positively correlated to body weight ($r = 0.75$); and the rate was significantly different between healthy and diseased individuals ($\chi^2 = 24$, $df = 4$, $P \geq 0.001$; chair square test). Shaka was taken to the veterinary unit at the time of his birth and was found free from disease and was given back to his parents. He therefore did not undergo quarantine and suffered no significant disease when compared to the wild chimpanzees.

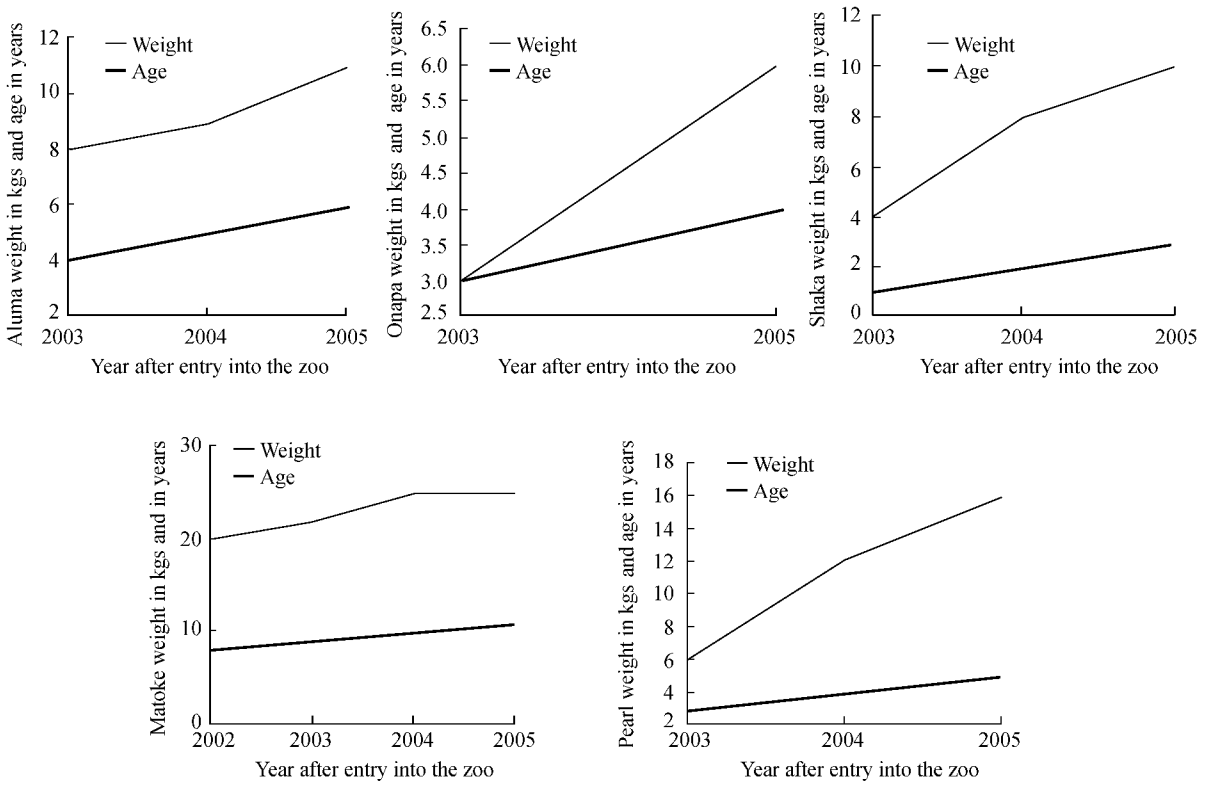


Fig.1 Change in weight and age with time of the studied zoo chimpanzees at UWEC

Aluma, Onapa, Matoke and Shaka are the male chimpanzees. Pearl is female.

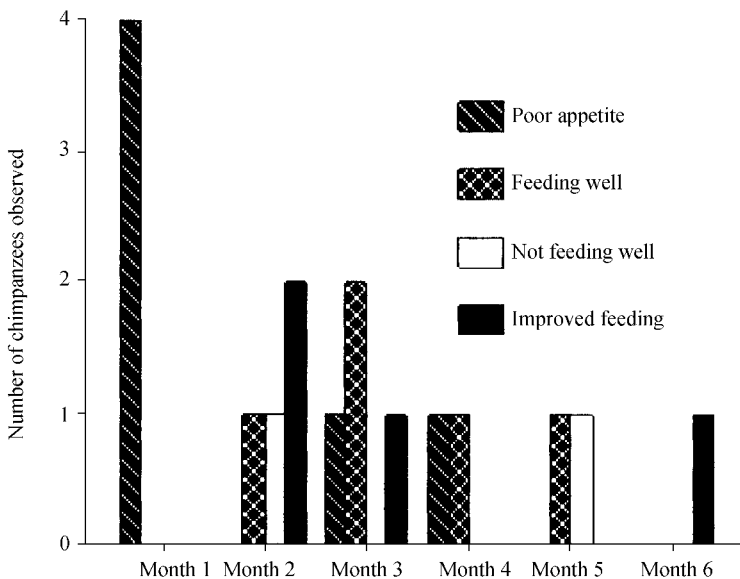


Fig.2 Time spent at veterinary unit in relation to feeding habits

The figure shows combined chimpanzees response to feeding. Some chimpanzees take up to six months in the veterinary unit.

2.3 Time spent at veterinary unit, diseases suffered and feeding characteristics

Whether in nature or captivity, sick chimpanzees tend to have poor appetite (Loehle, 1995) but this was not the case at UWEC as indicated by a weak positive correlation, $r = 0.2$ between diseases and feeding characteristics (Table 3). We assumed that this may be

attributed to the type of food that the UWEC chimpanzees were fed on compared to what the wild chimpanzees ate (Tweheyo et al., 2004). The UWEC chimpanzees feed mainly on farm raised food stuffs especially ripe banana, mangoes, pawpaw and other fruits with few leaves compared to the wild ones.

2.4 Diseases suffered and behavior characteristics

As usually expected, there was a negative correlation, $r = -0.3$ between diseases suffered by the chimpanzee and their activity. The more diseases suffered by the chimpanzees the less active they were (Table 4). This kind of behavior has also been observed in wild chimpanzees (Nishida et al., 1990). We observed that

diseases suffered by chimpanzees reduced over time as shown by the negative correlation coefficient ($r = -0.5$), between diseases suffered and the time chimpanzees spent in the zoo. Common diseases suffered are cough and flu. Injuries are common especially to those animals that are not submissive to the old individuals.

Table 3 Diseases suffered and related feeding characteristics when the chimpanzees were in the veterinary unit

Names	Months spent in veterinary unit	Diseases suffered *	Feeding characteristics			
			Poor appetite	Feeding well	Not feeding well	Improved feeding
Aluma	Month 1	DH, DS, PMI	1	0	0	0
	Month 2	T, DH, DS	0	1	0	0
	Month 3	FI, T	0	1	1	0
	Month 4	FI	1	0	0	1
Onapa	Month 1	B, J, T	1	0	0	0
	Month 2	PMC, T	0	0	0	1
	Month 3	LS, T	1	0	0	0
	Month 4	TP	0	1	0	0
Matoke	Month 1	L, DS, T	1	0	0	0
	Month 2	T, TM	0	0	0	1
	Month 3	T	0	1	0	0
Pearl	Month 1	B, DS, MA, BB, RT	1	0	0	0
	Month 2	C, TM	0	0	1	0
	Month 3	DA, PA, EI	0	0	0	1

DH: Dull hair. DS: Dry skin. PMI: Necrotic premolar 1. T: Trichuris ova. FI: Fungal infection. B: Bruises. J: Jiggers. PMC: Pale mucus membrane. LS: Loose stool. TP: Tape worms. L: Lice. TM: Trematode ova. MA: Muscle atrophy. BB: Bad breath. RT: Rotten teeth. C: Cestode ova. DA: Distended abdomen. PA: Puffed up armpits. EI: Enlarged inguinal nodes. 0: No. 1: Yes.

* Diseases were clustered per month of stay in the veterinary unit for each animal from the day of entry in to the veterinary unit.

Table 4 Diseases suffered and related social behavior of the chimpanzees in the veterinary unit

Names	Time spent in veterinary unit	Diseases suffered *	Social behavior			
			Very active	Active	Inactive	Recovering activity
Aluma	Month 1	DH, DS, PMI	0	1	0	0
	Month 2	T, DH, DS	1	0	0	0
	Month 3	FI, T	0	1	0	0
	Month 4	FI	0	0	2	1
Onapa	Month 1	B, J, T	0	0	1	0
	Month 2	PMC, T	0	0	0	1
	Month 3	LS, T	0	0	1	0
	Month 4	TP	1	0	0	0
Matoke	Month 1	L, DS, T	0	1	0	0
	Month 2	T, TM	0	1	0	0
	Month 3	T	1	0	0	0
Pearl	Month 1	B, DS, MA, BB, RT	0	0	1	0
	Month 2	C, TM	0	0	0	1
	Month 3	DA, PA, EI	0	1	0	0

DH: Dull hair. DS: Dry skin. PMI: Necrotic premolar 1. T: Trichuris ova. FI: Fungal infection. B: Bruises. J: Jiggers. PMC: Pale mucus membrane. LS: Loose stool. TP: Tape worms. L: Lice. TM: Trematode ova. MA: Muscle atrophy. BB: Bad breath. RT: Rotten teeth. C: Cestode ova. DA: Distended abdomen. PA: Puffed up armpits. EI: Enlarged inguinal.

Nodes: 0, 1 and 2 show the number of chimpanzees in each category.

* Diseases were clustered per month of stay in the veterinary unit for each chimpanzee from the day of entry to the veterinary unit.

2.5 Diseases suffered at exhibit, chimpanzee feeding habits and social behavior

There was a weak and negative relationship, $r = -0.1$ between time (months) and feeding characteristics of chimpanzees. Unlike at the veterinary unit, upon introduction into the exhibit the first month is usually very strange and tough, as the chimpanzee had to adjust to feeding with the rest of the animals. Diseases suffered and feeding habits were weakly correlated, $r = 0.2$ when the animal was introduced at the exhibit. Much as the chimpanzees suffered from certain diseases, their feeding characteristics were still good (an average of 11 hand picks per feeding bout). This may be due to the fact that the diseases suffered by the chimpanzees in the exhibit unit are not those that can lead to serious loss of appetite. These diseases included cough, influenza and injuries. In the exhibit, behavior was described in terms of activity, which was dependent upon the degree of interaction between the newly introduced chimpanzee and the other chimpanzees. There was a negative correlation, $r = -0.2$ between behavior and the diseases suffered. Whenever the chimpanzees suffered from any disease, their rate of activity lowered. This was not because of low appetite but rather discomfort caused by congestion of the oral mucosa mainly due to cough and influenza. The animals, which suffered injury, also feared to interact with those individuals who had injured them. However, time spent and chimpanzee behavioral change were negatively correlated ($r = -0.3$). This implies that the longer the animals stayed in the exhibit, the less active they became as compared to the veterinary unit. While in the exhibit, the newly introduced animals may be stubborn in the first month. This is because it does not know the norms and culture of the group and it is insubordinate to the old individuals. It is at this time that the newly introduced chimpanzees are injured due to attacks by the old individuals mainly because of lack of submission. The newly introduced chimpanzee will therefore become timid and will fear to interact with the rest of the chimpanzees. However, over time the newly introduced chimpanzee becomes submissive and learns to live with the rest of the individuals. They are then released to the island where they join other chimpanzees. Shaka was readily accepted by the social group and was submissive to the old individuals and therefore did not suffer any injuries. However, like the rest of the chimpanzees in the exhibit, he also suffered from cough and flu which are airborne diseases.

3 Discussion

Chimpanzees come into the zoo with different types and numbers of diseases from their habitats of origin. The commonest include those caused by nematodes, trematodes and strongloides such as *Schistosomiasis*, *Filariasis*, *Giardiasis* and *Salmonellosis*. This was in

agreement with (Butynski, 2001; Huffman, 1997) who found that irrespective of habitats, chimpanzees in the wild are vulnerable to diseases such as *Schistosomiasis*, *Filariasis*, *Giardiasis* and *Salmonellosis*. At UWEC, treating diseases took different durations depending on habitat of origin and this affected the integration and rejection processes showing that habitat of origin has an effect on understanding the captive animal integration. When compared with captive born, wild chimpanzees have a host of diseases which affect their feeding habits, social behavior and activity levels. Indeed it is important that chimpanzees from the wild are well treated for four main reasons: first to prevent infection of other captive chimpanzees; secondly to understand diseases in the wild; third to maintain the health of the other chimpanzees in the colony through understanding diseases symptoms; and four to improve their feeding and social behavior and energy levels. As noted, chimpanzees in captivity eat more food per unit time than wild chimpanzees of the same age. This is based on comparison with studies of wild chimpanzees of the same age e.g. in Mahale forest Tanzania (e.g. Nishida et al., 1990), Gombe forest Tanzania (e.g. Hladik, 1977; Goodall, 1986), in Kibale forest Uganda (e.g. Lambert, 1998), in Budongo forest Uganda (e.g. Reynolds, 1992; Tweheyo and Obua, 2001) and in Gabon (Hladik, 1977).

This understanding is not only essential for management of captive chimpanzees but wild as well. This is because (i) Conservation efforts should acknowledge the impact of diseases on chimpanzee feeding and behavior, and how this influences the success of integration projects; (ii) Since the last decade, conservationist have been facing challenges especially in funding related to poor publicity linked to the origin of diseases like HIV/AIDS and others in humans (Cantwell, 2001); and their relationship with wildlife. Thus studies like this that relate the origin of wild animals and their associated disease as they enter the zoos are essential in detecting trans-species infections which is essential to both conservationist and wildlife policy makers.

Chimpanzees are susceptible to many viruses and bacteria that infect people such as the common cold, influenza, pneumonia, whooping cough, tuberculosis, measles, yellow fever and Ebola fever (Adams et al., 1999). The chimpanzee that was born in captivity was not found to have any of these diseases on entry into the veterinary unit and had advanced feeding and social behavior when compared with wild chimpanzees. Consequently, treatment of diseases and acknowledgment of how this can affect feeding habits and social behavior is essential for the successful integration if wild born chimpanzees are to be continuously integrated into existing captive populations. In addition, since wild born chimpanzees have more diseases than captive born, there is need for significant veterinary care on wild chimpanzees

as this is vital to maintain the health of the other chimpanzees in the community. However, cases of common cold, influenza and cough were observed in the exhibit (personal observation), and on the chimpanzee island in Lake Victoria (Goodall, 1986). Mainly, the chimpanzees contracted these diseases from the humans (Adams et al., 1999). The newly introduced stubborn non-submissive chimpanzees were beaten up by the other chimpanzees and suffered from bite wounds and scratches which are a typical reflection of the wild chimpanzee communities (Goodall, 1986; Reynolds, 1992), while the submissive chimpanzees were readily accepted by the others. At UWEC, the search for dominance drove male chimpanzees to attack unfamiliar males as reported in wild chimpanzees (e.g. Hladik, 1977; Nishida and Uehara, 1983).

Depending on the habitat of origin, chimpanzees' initial response in captivity differs in behavior. For example, the chimpanzee that was hand reared prior to bringing into captivity preferred to interact with human beings on his arrival and refused to hug fellow chimpanzees or even give them hand shakes indicating a negative response to the integration. The other chimpanzees that were introduced directly from the wild did not have problems living with their fellow chimpanzees but had problems with interacting with humans. Younger chimpanzees both wild and captive were first associated with older female ones. When considering the age of chimpanzees and ease of integration Nishida et al. (1990) reported that mother-infant relationships usually stayed stronger for several years beyond weaning. While in captivity, chimpanzees tend to mimic this behavior because at UWEC, the younger the animal was, the longer it spent at the veterinary unit. This may then be attributed to the fact that such animals need more time to get used to living without their parents. Thus younger chimpanzees at UWEC required more time to integrate than the old.

The captive chimpanzees at UWEC were wary of the new individuals and took time to study them. However, they readily accepted captive-born individuals. Elsewhere, there is considerable evidence from captive chimpanzees that off-spring of close genetic relatives suffer reduced attacks from the community (Nash et al., 1999; Preuschoft et al., 2002). This seems typical of all captive bone chimpanzees in zoos (Mullan and Marvin, 1999). Such results indicate that while in captivity, chimpanzees try to form communities just like in the wild. In the wild, it has been reported that chimpanzees fight and sometimes kill individuals from other communities (e.g. Reynolds and Reynolds, 1965); or individuals from other communities take long to integrate into a new community because chimpanzees usually defend the community from any external aggression and more especially when new individual is a male or a female with

a young one (Hladik, 1977). Thus the process of integration of UWEC chimpanzees seems typical and a reflection of the wild. This is very essential for conservation especially where reintroduction may be the only option.

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