

Chimpanzee Tourism in Relation to the Viewing Regulations at the Mahale Mountains National Park, Tanzania

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Abstract: We investigated the current situation of chimpanzee tourism at the Mahale Mountains National Park by direct observations of tourists, tour guides, and trackers. The median number of people in a tourist group was seven, which is within the number allowed by park regulations; however, the actual number was sometimes as large as 11 because groups occasionally included several trackers and guides in addition to six tourists. On 23.1% of 121 observation days, the number of groups observing chimpanzees was greater than that permitted by park regulations. This resulted in as many as 39 people visiting one group of chimpanzees in a day. Problematic behaviors on the part of tourists included moving too close to chimpanzees, observing chimpanzees without authorized park guides, and simultaneous observation by two or more groups of tourists, among others. Based on these analyses, we argue that better control of tourist groups is needed in order to reduce the potential negative impacts of tourism on chimpanzee health and behavior.

Key words: Chimpanzee, *Pan troglodytes schweinfurthii*, ecotourism, Mahale Mountains National Park, number of tourists, behavior of tourists

Introduction

All great apes, including chimpanzees (*Pan troglodytes*), are either endangered or critically endangered (Beck *et al.* 2001; Caldecott and Miles 2005). Because of their evolutionary proximity to humans and the behavioral similarities between humans and apes, people all over the world are fascinated by great apes and wish to see them in the wild (Lonsdorf 2007). In many parts of Africa, the result has been the development of tourism, the main goal of which is to observe habituated chimpanzees or gorillas in the wild. This form of tourism is often regarded favorably in conservation terms as ecotourism that provides alternative income for local people who would otherwise use forests for agriculture, housing materials, firewood, and medicinal plants and sometimes hunt wild animals, including great apes, for meat. Such tourism can serve as an important source of funds for the conservation budget. For example, in Uganda, tourism has become the principal internal source of foreign exchange, and chimpanzee and gorilla tourism are responsible for 52% of the tourism revenue (Wrangham 2008).

Although there are many definitions of ecotourism (Fennell 2001), it usually includes the notion of sustainability,

which means there should be no or minimal negative impact on the target species or the natural environment (for example, Ceballos-Lascurain 1996). However, in many places, ecotourism has become an elusive term (Mugisha 2008) or merely a catchphrase (Nishida and Nakamura 2008) because, in reality, more weight is sometimes placed on increasing revenue than on minimizing human impact on nature or improving the well-being of local people. For example, Krüger (2005) analyzed 251 case studies of ecotourism and concluded that more effective control of tourist numbers and management of their distribution are needed for ecotourism to serve the purpose of promoting conservation.

Perhaps the most serious negative impact of tourism on great apes is the potential for the transmission of diseases from humans (for example, Boesch 2008). In Mahale and Gombe, diseases, especially infectious diseases, are the primary cause of chimpanzee deaths (Nishida *et al.* 2003; Williams *et al.* 2008), and outbreaks have killed as many as 12 chimpanzees at one time (for example, Hanamura *et al.* 2008). Although the cause of death could not be precisely determined, a virus that was formerly known only in humans has been detected

in samples collected from chimpanzees at the time of disease outbreaks (Kaur *et al.* 2008; Köndgen *et al.* 2008). If fatal diseases are transmitted from humans to chimpanzees, then presumably transmission risk becomes higher when the number of people who visit a group of chimpanzees becomes larger, in addition to other factors such as the duration of the visit and the proximity of approach.

Another negative impact of tourism on chimpanzees is that the presence of humans may cause chimpanzees to alter their natural behaviors. Reports have documented the behavioral changes that occur as great apes become habituated to humans (for example, Blom *et al.* 2004; Johns 1996). However, even for well-habituated chimpanzees, the presence of too many visitors may have negative effects, such as physiological and psychological stress (Wallis and Lee 1999).

Usually, each protected area has regulations or at least general rules that are designed to control the number of tourists and their behaviors. Such regulations specify the number of groups permitted per day and the number of people permitted in a group. However, the existence of regulations is not the same as their implementation, and a realistic appraisal is needed of the practices and behavior of tourists, guides and park staff involved in ape tourism.

The only quantitative research addressing the details of great ape tourism was conducted on mountain gorillas of the Bwindi Impenetrable National Park in Uganda, reported by Sandbrook and Semple (2006). The authors interviewed tourists after their return from viewing the gorillas and asked them how close they had been to the gorillas. They found that the distance between the tourists and the gorillas was significantly less than that permitted by park regulations, providing a warning that the existence of regulations does not necessarily reduce potential problematic behaviors.

History of tourism at Mahale

The habituation of chimpanzees at Mahale for research purposes began in 1965 (Nishida 1968), and the research has continued since then. Initially, two groups (or communities) of chimpanzees were habituated for research, but one of them became extinct in the 1980s (Nishida *et al.* 1985). Only one habituated group of chimpanzees is, therefore, currently accessible at Mahale for both research and tourism purposes.

In 1987, small-scale chimpanzee tourism was introduced to Mahale; up to six visitors at a time were accepted into a tent camp and allowed to spend up to one hour observing the chimpanzees. In the mid-1990s, Tanzania National Parks (TANAPA) began to accept tourists in its own tourist camp. In the early 2000s, two more companies joined the tourist business at Mahale, increasing the number of tourists in the park from only 200 per year in the early 1990s to more than 1,000 in 2005 (Nishida and Nakamura 2008). Usually each tourist stays three to four days (sometimes a week), thus the total man-days is much larger.

As competition developed among commercial tourism companies at Mahale, TANAPA and the Frankfurt Zoological Society (FZS) requested a preliminary assessment of the

tourism there (Walpole 2004). However, the assessment was insufficient because it was conducted during a relatively low tourist season and lasted for only one week. Furthermore, because the chimpanzees were in the higher part of their range at the time, the assessor did not observe any chimpanzees during the week, and was consequently unable to observe how the tourists were behaving when observing chimpanzees.

Other reports from Mahale include annual statistics on the number of tourists visiting (Nishida and Mwinuka 2005) and reports of researchers' impressions of an overabundance of tourists (Nakamura and Nishida 2004; Nishida and Nakamura 2008), although these impressions were not accompanied by empirical data. Thus, the aim of this study was to gather quantitative data on chimpanzee tourism at Mahale by direct observation of tourist groups that were visiting the chimpanzees and to assess how closely the procedures and behaviors of the tourists, guides and trackers complied with the park regulations.

Regulations of tourism at Mahale

According to the park regulations (Tanzania National Parks 2006), maximum viewing-group size is seven, including six tourists and one TANAPA guide. In addition to these seven, one tracker and one tour-camp-provided guide may accompany the tracking excursion, but once the chimpanzees are sighted, only the six tourists and the TANAPA guide may approach the chimpanzees. The tracker and tour-camp-provided guide must remain 200 m away from the chimpanzees all the time. The figure is similar to gorilla tourism where limitation is set at six in Uganda and eight in Rwanda and Democratic Republic of Congo (Homsy 1999).

The maximum number of groups per day permitted to observe the chimpanzees is three but they have to be timed so that two or more groups do not visit the chimpanzees at the same time. As such, the park regulations allow 18 tourists and 21 people in total to visit the chimpanzees per day. This figure is different from gorilla tourism where only one visit per day per group is permitted (Homsy 1999). In addition to these tourists and guides, three researchers and three research assistants are permitted to follow the M group chimpanzees.

There are regulations that stipulate the distance of the observers (10 m) from the chimpanzees, observation duration (one hour), restriction of flash lights, eating in the presence of or near chimpanzees, defecating in the forest, leaving belongings unattended. The regulations do not stipulate a minimum or maximum chimpanzee party size for visitation.

Methods

The study was conducted from July 2006 to October 2008 at the Mahale Mountains National Park, Western Tanzania. For more details about the site see Nishida (1990). While observing chimpanzees of the M group, the first author (MN) and a research assistant opportunistically recorded the number of tourist groups that visited the chimpanzees and the number of people within each group, sorted into categories

(i.e., tourists, official park guides, private camp trackers, and guides employed by tourist companies). Such data collection was possible because we personally recognized each park guide, camp tracker, and camp guide. We also recorded the tourists' behaviors, their distance from chimpanzees (estimated visually), and any apparent health conditions (such as coughing) among the tourists that might be potential threats or disturbances to the chimpanzees. Both observers were well accustomed to the normal behaviors of chimpanzees, allowing us to monitor each chimpanzee's location (as visitors sometimes unintentionally disturb chimpanzees in the nearby bush) and the chimpanzees' responses to tourists. Due to the observation conditions, we were not able to record all of these data for each tourist visit. In calculating medians, unconfirmed data were excluded from the analysis. We did not encounter all tourist groups because sometimes observers and tourists followed different parties of chimpanzees. Thus, the number of groups per day and the number of people in a group may be slightly underestimated. In addition to these data, information on tourists recorded in camp diaries was used to supplement our data (for example, when other researchers observed different tourist groups or when they witnessed some violation of the regulation by tourist groups).

Results

General pattern of chimpanzee tourism at Mahale

In Mahale, three tourist camps are run by tour companies in addition to the TANAPA camp, Banda, which also receives tourists. When a camp has guests, it usually sends out one to three trackers in the early morning to locate chimpanzees. If multiple trackers are sent, they often try to locate different parties in order to offer the tourists a better option (usually, a larger party with an alpha male or with infants is preferred by tourists over, for example, a lone, low-ranking male). When the trackers locate the chimpanzees, they communicate with their camp using transceivers. Because the chimpanzees are usually on the move, the trackers continue following the chimpanzee party, sometimes for more than four hours, until the tourists arrive. As there are three tourist camps, it is often the case that three to five camp trackers simultaneously follow a party of chimpanzees, in addition to any researchers and research assistants.

Tourists are led by a camp guide (and/or a camp manager) and accompanied by an official park guide. This double-guide system was introduced because initially most of the park guides did not speak English. The camp guides, who are usually not local people but are from large cities in Tanzania, have relatively high levels of education and speak English well. After they come to Mahale, they are trained to give a general presentation about chimpanzees. Although the park guides now also speak English and some are locally hired, they do very little guide work with tourists. As a matter of fact, some of them do not have enough knowledge of chimpanzee identities and their behavior; instead, camp guides fulfill that role. A park guide accompanies the tourist group because

regulations require it, and the tourists pay a fee for the guide. Although we did not collect data on the nationality of tourists systematically, according to the identity expressed in greetings with tourists, the majority of them seemed to be from North America and Europe, some from Asia, and we met virtually no African tourists except for those from South Africa.

A tour group usually stays with the chimpanzees for a period of one hour, the time permitted by regulations, and the time is measured by the park guide. Even after the tourists arrive at a site, the camp trackers do not retreat but wait nearby, because if the chimpanzees move to an area where they cannot be observed, the trackers must follow them to locate an alternative place where the chimpanzees will be visible to the tourists.

Number of people in a tourist group

Table 1 shows the number of people observed in tourist groups. The median number of tourists (excluding guides and trackers) was five (range 1–7, N = 233 groups). The median total number in a group (including guides and trackers) was seven (range 1–11, N = 218 groups). On average, the number of people in a group was within the limit set by park regulations, but the total number per group was sometimes larger, as there were often several trackers and two guides in addition to the six tourists.

Table 1. Number of people in a tourist group visiting chimpanzees. Park regulations permit 6 tourists and 1 guide per group.

| Number of people in a group | Tourists only (number of groups) | Including guides and trackers (number of groups) |
|-----------------------------|----------------------------------|--|
| 1 | 8 | 2 |
| 2 | 39 | 5 |
| 3 | 19 | 10 |
| 4 | 39 | 18 |
| 5 | 41 | 21 |
| 6 | 84 | 22 |
| 7 | 3 | 44 |
| 8 | | 43 |
| 9 | | 40 |
| 10 | | 10 |
| 11 | | 3 |
| Total* | 233 | 218 |

* Total numbers differ because we could sometimes count only tourists and could not count trackers who sometimes keep distance from the tourists.

Number of tourist group visits per day

For the 121 days on which we recorded our observations, one tourist group visited on 38 days (31.4%), two on 38 days (31.4%), three on 17 days (14.1%), four on 16 days (13.2%), five on 10 days (8.3%), and six on 2 days (1.7%; Table 2). Of the days on which there were more than three tourist groups, 96.6% were concentrated between June and October (corresponding to the dry season), with only one exception in February.

Table 2. Number of tourist groups per day. N = 121 observation days.

| Number of groups | Observed days | Percentage to the total |
|------------------|---------------|-------------------------|
| 1 | 38 | 31.4% |
| 2 | 38 | 31.4% |
| 3 | 17 | 14.1% |
| 4 | 16 | 13.2% |
| 5 | 10 | 8.3% |
| 6 | 2 | 1.6% |
| Total | 121 | |

Total number of people visiting the M group per day

A median of eight (range 1–27) tourists visited per day (N = 107 days). The median total number (including trackers and guides) of daily visitors per day was 13 (range 2–39, N = 102 days).

Problematic behaviors of tourists, camp trackers, and guides

Table 3 summarizes some of the problematic behaviors of tourists. The minimum distance permitted between tourists and chimpanzees at Mahale is 10 m. Fifteen cases were observed when tourists violated this limit. In ten other cases, the groups were accompanied only by camp guides but not by authorized park guides. It is a matter of concern that in nine cases, tourists or trackers were observed coughing while they were observing the chimpanzees.

Table 3. Problematic behaviors of tourists, guides, and camp trackers.

| Behaviors | Number of cases observed |
|---|--------------------------|
| Too close to chimpanzees | 15 |
| Tourists without park guides | 10 |
| Coughing | 9 |
| Disturbing chimpanzees | 9 |
| Two or more tourist groups in one place | 7 |
| Going into bush | 5 |
| Disturbing researchers | 4 |
| Using flashlights | 4 |
| Staying longer than permitted | 3 |
| Not wearing face masks | 2 |
| Unattended belongings | 1 |
| Defecating in the forest | 1 |

Discussion

The number of tourists in a group usually fell within the six-tourist limit specified by park regulations (Tanzania National Parks 2006). Also, most groups adhered to the observation time of one hour, with only a few exceptions (see Table 3). This suggests that the tourist camps were trying to abide by the regulations regarding group size and observation time. In contrast, the number of visiting tourist groups exceeded the limit of three groups per day on 23.1% of the observed days. This figure may be even larger, given that we probably did not encounter all tourist groups. This happens

because each camp has the capacity to accommodate more than one group of six tourists per day, and if more than one tourist group want to visit Mahale, these camps comply with the requests. Even in such cases, the total number of groups in a day does not necessarily exceed three because another camp may not have guests on that day. However, the problem often occurs during the high tourist season when all camps tend to have two or more groups of tourists, and camps do not communicate with each other about the number of tourist groups each is planning to take to visit the chimpanzees on a given day. MN asked the park guides several times about this situation. The guides responded that the TANAPA authority accepted the situation and had no plans to attempt to control it until they introduce a new booking system. Although at present a median of 13 people per day may seem tolerable, as it is within the limits of the regulations, daily numbers fluctuate. The fact that 39 people could visit a group of chimpanzees on one day should not be disregarded. If the number of tourists continues to increase and additional tourists fill the days that are currently vacant, it is possible that 30 to 40 people will be visiting every day the single habituated chimpanzee group of about 60 individuals. If 39 people keep visiting every day, that would make 14,235 people per year.

The large number of tourist groups also poses a problem when two or more tourist groups meet unintentionally. This often happens when two groups of tourists arrive from different directions on an observation trail, with chimpanzees between the two groups. Such encounters may have negative impacts on chimpanzee behaviors, as some shy chimpanzees, especially some females, are stressed by being surrounded by humans. In addition, it has been reported that visitor satisfaction declines when the number of people simultaneously observing the chimpanzees exceeds six to eight (Johns 1996). The meeting of two or more tourist groups should, therefore, be avoided for this reason as well by perhaps controlling and differentiating the timing of visit to the chimpanzees.

In 15 cases, tourists were observed approaching closer than the permitted 10-m distance from the chimpanzees. This figure may seem relatively small compared to the almost daily violations of the distance rule observed in Bwindi gorilla tourism (Sandbrook and Semple 2006). The low incidence of distance violations at Mahale may be partly due to the presence of researchers at the observation location. Usually when tourists arrive, researchers are already observing the chimpanzees. Because we repeatedly ask camp guides to stay at a distance from the chimpanzees, they may not dare to go closer in our presence. In many of the 15 observed cases of distance violation, tourists and guides did not seem to notice the presence of researchers. This suggests that, in the absence of researchers, tourists might approach closer to chimpanzees even more often. The main reason that people must keep a distance from chimpanzees is to avoid interspecies transmission of diseases, but distance is also crucial for the safety of tourists. It should be required to inform tourists prior to their visits to chimpanzees why the distance rule has to be adhered to. Likewise it is necessary to prohibit tipping guides for getting closer to the apes.

Researchers previously proposed a rule that everyone who visits the chimpanzees should wear a surgical mask (Hanamura *et al.* 2006), and the rule is now accepted and followed by all camps. However, another regulation specifies that anyone who is not in good health must not visit the chimpanzees. Tourists also unintentionally disturb the chimpanzees' natural behaviors by surrounding them, or standing between a mother and her offspring. Sometimes relatively shy chimpanzees avoid people and go into dense bush or remain in the bush when people approach. In one case, a female tourist was hit by a male chimpanzee because she was unable to move out of the route of the male's charging display.

Tourists themselves may be able to reduce the incidence of the above-mentioned problems if they are well informed about the existence of, and the reasons for, the regulations. However, tourists have no direct control over another problem, which is that two or more groups may meet in the same place at the same time to observe the same chimpanzees because neither group is aware of the plans of the other group. Although park regulations specify that different tourist groups should observe different parties, because chimpanzees have fission-fusion social structures, two different tourist groups sometimes meet in the forest as a result of following different parties.

Finally, to reduce stress on the chimpanzees and to foster genuinely sustainable ecotourism at Mahale, we propose the following five recommendations.

1. The number of groups per day must be strictly limited to three. This can be achieved by introducing a unified booking system controlled by the park management. For the time being, park officials should mediate constant communication among tourist camps. If the park management needs more annual revenue, higher entrance fees or introduction of "the chimpanzee fee" (Nishida and Mwinuka 2005) will be a definite option.
2. Only one group of tourists should be allowed to visit the chimpanzees at any one time. This can best be achieved when the first recommendation (i.e., the limit on groups allowed per day) is strictly followed. The park management should coordinate and arrange the timing of observations by different tourist groups.
3. The total number of people in a group should be reduced. Capacity building of park guides is crucial. This would eliminate the need for camp guides. The presence of capable park guides will bring benefits to both tourist companies and conservation.
4. The presence of tourists should not be allowed to disturb the behaviors of chimpanzees. When chimpanzees approach them, tourists should gently step back until they have enough distance before they take photographs. Tourists must be reminded that chimpanzees have the ability to severely injure humans. Tourists should receive

better instructions before they are allowed to observe chimpanzees.

5. Some hygienic measures should be considered, such as presenting updated vaccination certificates for potentially very dangerous diseases and the washing of the soles of people's shoes to prevent bringing in or taking out germs.

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Literature Cited

- Beck, B. B., T. S. Stoinski, M. Hutchins, T. L. Maple, B. Norton, A. Rowan, E. F. Stevens and A. Arluke (eds.) 2001. *Great Apes and Humans. The Ethics of Coexistence*. Smithsonian Institution Press, Washington, DC.
- Blom, A., C. Cipolletta, A. M. H. Brunsting and H. H. T. Prins. 2004. Behavioral responses of gorillas to habituation in the Dzanga-Ndoki National Park, Central African Republic. *Int. J. Primatol.* 25: 179–196.
- Boesch, C. 2008. Why do chimpanzees die in the forest? The challenges of understanding and controlling for wild ape health. *Am. J. Primatol.* 70: 1–5.
- Caldecott, J. and L. Miles (eds.) 2005. *World Atlas of Great Apes and their Conservation*. University of California Press, Berkeley.
- Ceballos-Lascurain, H. 1996. *Tourism, Ecotourism and Protected Areas*. IUCN–The World Conservation Union, World Commission on Protected Areas (WCPA), Gland, Switzerland.
- Fennell, D. A. 2001. A content analysis of ecotourism definitions. *Curr. Issues Tourism* 4: 403–421.
- Hanamura, S., M. Kiyono, M. Nakamura, T. Sakamaki, N. Itoh, K. Zamma, R. Kitopeni, M. Matumula and T. Nishida. 2006. A new code of observation employed at Mahale: prevention against a flu-like disease. *Pan Afr. News* 13: 1–16. Website: <[http://mahale.web.infoseek.co.jp/PAN/13_2/13\(2\)_01.html](http://mahale.web.infoseek.co.jp/PAN/13_2/13(2)_01.html)>. Accessed: 26 July 2009.
- Hanamura, S., M. Kiyono, M. Lukasik-Braum, M. Mlengeya, M. Nakamura and T. Nishida. 2008. Chimpanzee deaths at Mahale caused by a flu-like disease. *Primates* 49: 77–80.
- Homsy, J. 1999. *Ape Tourism and Human Diseases: How Close Should We Get? A Critical Review of the Rules and Regulations Governing Park Management and Tourism for the Wild Mountain Gorilla*, Gorilla gorilla beringei.

- Report of a Consultancy for the International Gorilla Conservation Programme, Kigali, Rwanda.
- Johns, B. G. 1996. Responses of chimpanzees to habituation and tourism in the Kibale Forest, Uganda. *Biol. Conserv.* 78: 257–262.
- Kaur, T., J. Singh, S. Tong, C. Humphrey, D. Clevenger, W. Tan, B. Szekely, Y. Wang, Y. Li, E. A. Muse, M. Kiyono, S. Hanamura, E. Inoue, M. Nakamura, M. A. Huffman, B. Jiang and T. Nishida. 2008. Descriptive epidemiology of fatal respiratory outbreaks and detection of a human-related metapneumovirus in wild chimpanzees (*Pan troglodytes*) at Mahale Mountains National Park, Western Tanzania. *Am. J. Primatol.* 70: 755–65.
- Köndgen, S., H. Kuhl, P. K. N’Goran, P. D. Walsh, S. Schenk, N. Ernst, R. Biek, P. Formentry, K. Matz-Rensing, B. Schweiger, S. Junglen, H. Ellerbrock, A. Nitsche, T. Briese, W. I. Lipkin, G. Pauli, C. Boesch and F. H. Leendertz. 2008. Pandemic human viruses cause decline of endangered great apes. *Curr. Biol.* 18: 260–264.
- Krüger, O. 2005. The role of ecotourism in conservation: panacea or Pandora’s box? *Biodivers. Conserv.* 14: 579–600.
- Lonsdorf, E. V. 2007. The role of behavioral research in the conservation of chimpanzees and gorillas. *J. Appl. Anim. Welfare Sci.* 10: 71–78.
- Mugisha, A. 2008. Potential interactions of research with the development and management of ecotourism. In: *Science and Conservation in African Forests: The Benefits of Long-term Research*, R. W. Wrangham and E. Ross (eds.), pp. 115–128. Cambridge University Press, Cambridge, UK.
- Nakamura, M. and T. Nishida. 2004. Present status of conservation on chimpanzees and their habitat in Mahale. *Primate Res.* 20: 57–61. In Japanese.
- Nishida, T. 1968. The social group of wild chimpanzees in the Mahali Mountains. *Primates* 9: 167–224.
- Nishida, T. (ed.). 1990. *The Chimpanzees of the Mahale Mountains: Sexual and Life History Strategies*. University of Tokyo Press, Tokyo.
- Nishida, T. and C. Mwinuka. 2005. Introduction of seasonal park fee system to Mahale Mountains National Park: a proposal. *Pan Afr. News* 12: 17–19. <[http://mahale.web.infoseek.co.jp/PAN/12_2/12\(2\)_02.html](http://mahale.web.infoseek.co.jp/PAN/12_2/12(2)_02.html)>. Accessed: 26 July 2009.
- Nishida, T. and M. Nakamura. 2008. Long-term research and conservation in the Mahale Mountains, Tanzania. In: *Science and Conservation in African Forests: The Benefits of Long-term Research*, R. W. Wrangham and E. Ross (eds.), pp. 173–183. Cambridge University Press, Cambridge, UK.
- Nishida, T., M. Hiraiwa-Hasegawa, T. Hasegawa and Y. Takahata. 1985. Group extinction and female transfer in wild chimpanzees in the Mahale National Park, Tanzania. *Z. Tierpsychol.* 67: 284–301.
- Nishida, T., N. Corp, M. Hamai, T. Hasegawa, M. Hiraiwa-Hasegawa, K. Hosaka, K. D. Hunt, N. Itoh, K. Kawana, A. Matsumoto-Oda, J. C. Mitani, M. Nakamura, K. Norikoshi, T. Sakamaki, L. Turner, S. Uehara and K. Zamma. 2003. Demography, female life history, and reproductive profiles among the chimpanzees of Mahale. *Am. J. Primatol.* 59: 99–121.
- Sandbrook, C. and S. Semple. 2006. The rules and the reality of mountain gorilla *Gorilla beringei beringei* tracking: how close do tourists get? *Oryx* 40: 428–433.
- Tanzania National Parks. 2006. *Mahale Mountains National Park: General Management Plan 2006–2016*. TANAPA, Arusha.
- Wallis, J. and D. R. Lee. 1999. Primate conservation: the prevention of disease transmission. *Int. J. Primatol.* 20: 803–826.
- Walpole, M. 2004. *An Assessment of Tourism in Mahale Mountains National Park, Tanzania*. A report compiled in preparation for the General Management Plan, Tanzania National Parks, (TANAPA), Arusha, Tanzania, and Frankfurt Zoological Society, Frankfurt.
- Williams J. M., E. V. Lonsdorf, M. L. Wilson, J. Schumacher-Stankey, J. Goodall and A. E. Pusey. 2008. Causes of death in the Kasekela chimpanzees of Gombe. *Am. J. Primatol.* 70: 766–777.
- Wrangham, R. 2008. Why the link between long-term research and conservation is a case worth making. In: *Science and Conservation in African Forests: The Benefits of Long-term Research*, R. W. Wrangham and E. Ross (eds.), pp.1–18. Cambridge University Press, Cambridge, UK.

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