

# Pan Africa News

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



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Publication of the next issue will be **June 2008**. Deadline for manuscripts is the **end of May**.

## Contents

### <NEWS>

#### Massive New Rainforest Reserve Established in the Democratic Republic of Congo

*Michael Hurley*

17

### <NOTE>

#### Preliminary surveys of chimpanzees in Gouéla area and Déré Forest, the Nimba Mountain Biosphere Reserve, Republic of Guinea

*Granier Nicolas, Marie-Claude Huynen &*

*Tetsuro Matsuzawa*

20

### <NOTE>

#### First Assessment of Chimpanzee (*Pan troglodytes troglodytes*) density and bedding behaviour in the Pongara National Park, Gabon

*Charles-Albert Petre, Marie-Claude Huynen &*

*Roseline Beudels-Jamar*

22

### <NOTE>

#### Assessment of the planted trees in Green Corridor Project

*Tetsuro Matsuzawa*

27

### <NOTE>

#### Exploratory-threat behaviors in wild chimpanzees encountering a porcupine

*Takahisa Matsusaka*

29

### <NOTE>

#### Note on a subcutaneous tumor found among wild chimpanzees

*Toshisada Nishida, Shiho Fujita, Agumi Inaba &*

*Takanori Kooriyama*

31

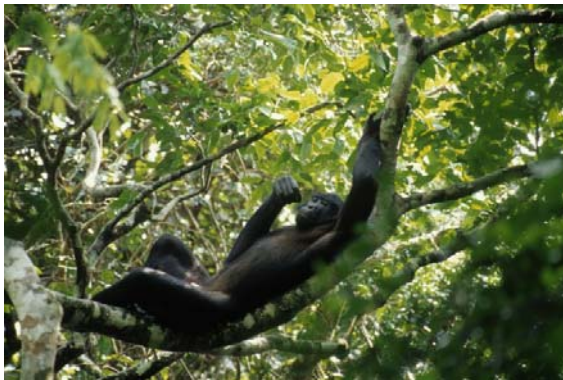
### <NEWS>

## Massive New Rainforest Reserve Established in the Democratic Republic of Congo

*Michael Hurley*

*Bonobo Conservation Initiative*

The Bonobo Conservation Initiative (BCI) joins the government of the Democratic Republic of Congo (DRC) in announcing the creation of the new Sankuru Nature Reserve, a huge rainforest area harboring the endangered bonobo, a great ape most closely related to humans. Larger than the state of Massachusetts, the new reserve encompasses 11,803 square miles of tropical rainforest, extremely rich in biodiversity.



**Fig. 1** Wild bonobos of the Kokolopori Reserve, in the Central Congo Basin. Photos by Jeffry Oonk.

"This is a monumental step towards saving a significant portion of the world's second largest rainforest, of critical importance to the survival not only of humankind's closest great ape relative, the bonobo, but to all life on earth given the increasing threat of climate change," said Sally Jewell Coxe, president and

co-founder of the Bonobo Conservation Initiative.

The Sankuru region was hit very hard during the recent war in the Congo, which devastated the local people and claimed four million lives -- more than any war since WWII. In addition to the critical environmental challenges presented by unsustainable hunting, the humanitarian crisis must also be addressed. "The people of Sankuru rely on the forest for every aspect of their livelihood. Helping them to develop new economic opportunities apart from the bushmeat trade is one of the most urgent priorities," Coxe said.

In danger of extinction, bonobos (*Pan paniscus*) were the last great ape to be discovered and are the least known great ape species. Found only in the DRC, bonobos inhabit the heart of the Congo Basin, Africa's largest rainforest, which is threatened by the onslaught of industrial logging. Bonobos are distinguished by their peaceful, cooperative, matriarchal society, remarkable intelligence, and sexual nature. Other than humans, bonobos are the only primates known to have sex not only for procreation, but also for pleasure and conflict resolution -- and with members of either sex. They serve as a powerful flagship both for conservation and for peace.

In addition to the bonobo, the Sankuru Reserve contains the okapi (*Okapia johnstoni*), an exotic short necked forest giraffe also endemic to the DRC, but not previously found outside of their known range far to the northeast. Survey teams from the Congo's Center for Research in Ecology and Forestry (CREF) sponsored by BCI made this exciting discovery. Sankuru also contains elephants, which have been hunted out in many other areas of the Congo forest, plus at least 10 other species of primates, including the rare owl faced monkey and blue monkey.

The wildlife is under intense pressure from organized hunting for the commercial bushmeat trade. The report from the Congolese Institute for Conservation of Nature (ICCN) on its recent expedition to the area states that "the ecocide must be stopped" and recommends immediate action to protect this invaluable ecosystem and watershed. The DRC Minister of the



**Fig. 2** Bushmeat. All 11 species of primates in Sankuru are heavily hunted for food and income (above). In DRC, other wild animals such as leopard (below) are also victimized by bushmeat hunting that is an important source of food and revenue and is a serious threat in the region. Photos by Bonobo Conservation Initiative.

Environment, Didace Pembe Bokiaga, who officially declared the new reserve, said, "This increases the total area of protected land in the DRC to 10.47%, bringing us closer to our goal of 15%. We are proud that the Sankuru Reserve is being created in the framework of community participative conservation...and will be zoned to guarantee the rights of the local population."

Andre Tosumba, director of BCI's Congolese NGO partner, ACOPRIK (Community Action for the Primates of Kasai), led the successful local effort to protect Sankuru. "When I saw the extent to which people were hunting bonobos, okapi, and elephants, we began to sensitize them to realize the value of these animals," he said. "Once they came to understand, the people themselves decided to stop hunting these precious species



**Fig. 3** Sankuru teams. Local teams are trained and equipped to participate in surveys and monitoring programs. Photo by Bonobo Conservation Initiative.

and to create a reserve to protect their forest. BCI has helped ACOPRIK and the local people at every step of the way...we call on the international community to join our effort."

Protecting Sankuru Reserve's forest will contribute significantly to mitigating global warming. Approximately 20% of annual green house gas emissions come from deforestation and other land-use change. Keeping this rich tropical forest intact will make an important contribution to global efforts to reduce emissions while simultaneously conserving biodiversity. The Sankuru Reserve stores up to 660 million tons of carbon, which if released by deforestation would emit up to 2 billion tons of carbon dioxide, comparable to emissions from 38,000,000 cars per year for 10 years.

"This is a huge victory for bonobo and rainforest conservation," Coxe said. "However our work has just begun. Now we need investment to successfully manage the reserve. And, other areas need to be protected to ensure the long-term survival of the bonobo and the integrity of the Congo rainforest." The Sankuru Reserve is the southern anchor for a constellation of linked, community-based reserves being developed by BCI in the Bonobo Peace Forest, a project supported by DRC President Joseph Kabila since its inception in 2002.

The Bonobo Conservation Initiative (BCI) is a nonprofit 501(c)(3) organization dedicated to the survival

of the highly endangered bonobo (*Pan paniscus*) and its rainforest habitat in the Congo Basin. BCI works with indigenous Congolese people through cooperative conservation and community development programs and the government of the DRC to establish new protected areas and to safeguard bonobos wherever they are found. BCI has been selected as a featured charity in the Catalogue for Philanthropy for excellence, innovation and cost-effectiveness.

Initial support for this project has been provided by the Great Ape Conservation Fund, administered by the US Fish and Wildlife Service in collaboration with USAID's Central African Regional Program for the Environment.

*Editor's Note:* This report originally appeared in YubaNet.com on November 16, 2007, and is reproduced here by courtesy of Mr. Michael Hurley, Executive Director of Bonobo Conservation Initiative.

<NOTE>

## Preliminary surveys of chimpanzees in Gouéla area and Déré Forest, the Nimba Mountain Biosphere Reserve, Republic of Guinea

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Located in the heart of the Upper Guinea forest ecosystem, West Africa, Mont Nimba delimits the tri-national border between Guinea, Côte d'Ivoire and Liberia (cf. Fig. 1). This site exhibits a unique and highly endemic biodiversity which has been protected and scientifically explored for over sixty years. Among other protective statuses, it was gazetted a World Heritage natural site (1981) and Biosphere Reserve (1982), with a core area estimated at 217.8 km<sup>2</sup>.

The presence of chimpanzees in the Nimba area was reported sixty-five years ago<sup>1</sup>, but growing interest for the species began in 1993<sup>2,3,4</sup>. Recently, the Nimba Mountain was declared an "Extremely Important Area" for the conservation of West African chimpanzees<sup>5</sup>. Nevertheless, to date, available information on chimpanzees inhabiting the Nimba range is still scarce and almost nonexistent concerning the neighbouring Déré forest<sup>6</sup>.

From March to April 2006 and December 2006 to May 2007, 68 days were spent surveying chimpanzees (*Pan troglodytes verus*) in two poorly explored parts of the Nimba Mountain: the Gouéla area (south slope of the northern part of the mountain range) and the Déré forest. The survey method combined 62 days of field

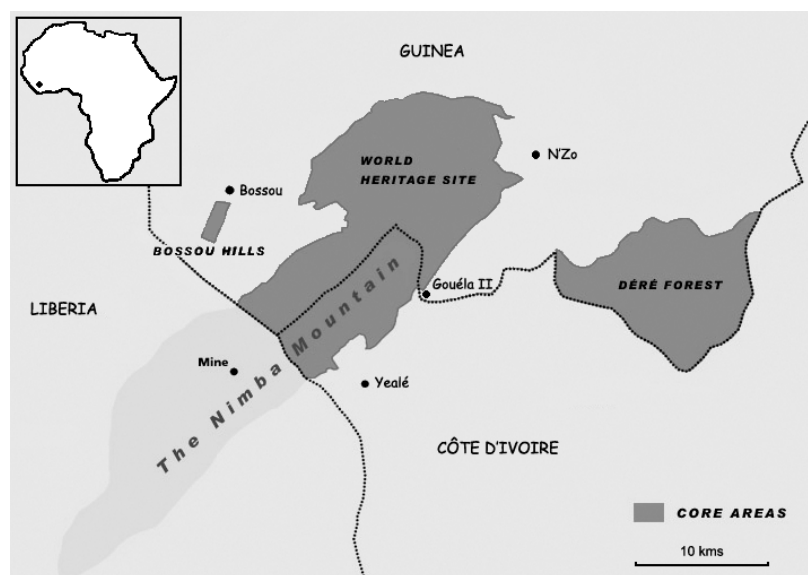


Fig. 1 The Nimba Mountain Biosphere Reserve.

reconnaissance carried out to assess the status of chimpanzees and their habitat, and 6 days of interviews with villagers. Thirty-two interviews were performed in 18 human settlements on the east side of the Nimba Mountain to obtain a preliminary idea of the chimpanzee presence. Interviewees consisted of hunters and cultivators, and were contacted either individually or in groups of 2 to 14 people. Questions were directed at the chimpanzee presence, abundance, distribution and their relationship with humans. Field surveys consisted of daily reconnaissance walks performed in order to cover the largest possible area, investigating evidence of chimpanzee presence and following their tracks. A GPS unit (Garmin® 60CS) was used to record the surveyed tracks and all evidence of chimpanzee presence was geo-referenced. Base camps established in the vicinity of surveyed areas were visited at least every 3 days. The surveying team was composed of 1 to 3 local assistants plus one of the authors (GN).

Over 49 days, the Gouéla area was widely explored from 3 base camps: Gouéla II, Taï and G'Bié (cf. Fig. 2). Thirty-seven days were spent in Gouéla II base camp, which was the most extensively explored site. The survey of Déré forest was carried out over 13 days, amongst which 10 days were spent in the western part of Cavally River (cf. Fig. 2).

### Results for the Gouéla area

About 300 kilometres were walked in the Gouéla area. GN followed and recorded evidence of chimpanzees such as beds (=nests)<sup>7</sup>, faeces, alimentary leftovers, footprints, vocalizations and ant-catching wands (cf. Table 1).

**Table 1** Chimpanzee-related evidences.

Items	Number	Altitude (m)
Groups of recent bed <sup>(i)</sup>	19	750-1050
Groups of old bed <sup>(ii)</sup>	11	450-720
Faeces <sup>(iii)</sup>	19	720-950
Footprints	7	930-1100
Vocalizations <sup>(iv)</sup>	5	750- 800
Trails used by chimpanzee	6	850-1100
Ant-catching wands <sup>(v)</sup>	7	820
Alimentary leftovers	3	800-1000

(i) Mean size of recent bed groups:  $7.47 \pm SD$ ;  $SD=5.57$

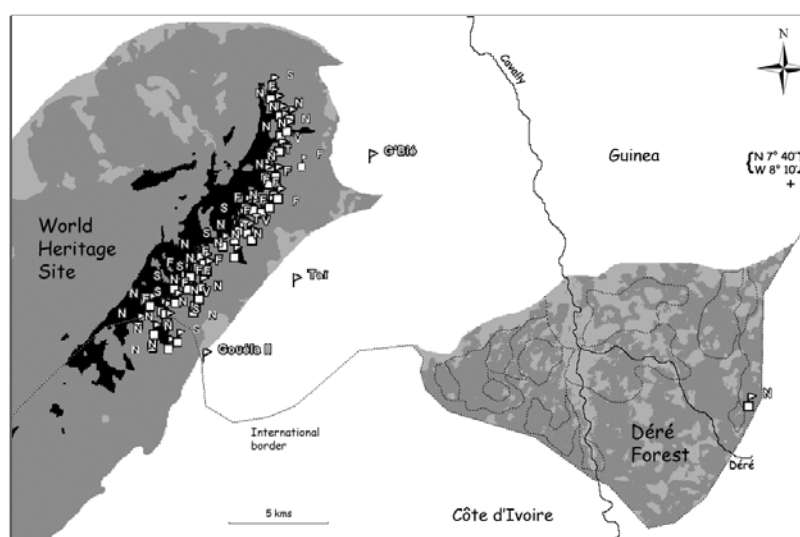
(ii) Mean size of old bed groups:  $3.45 \pm SD$ ;  $SD=2.02$

(iii) Seeds of *Musanga cecropioides*, *Trema guineensis*, *Harungana madagascarensis*, *Aframomum* sp. and *Ficus* sp. were found in chimpanzee faeces.

(iv) Altitude refers to the position of the author when vocalizations were heard.

(v) One ant-dipping site was observed. Vegetal materials used: *Aframomum* sp.<sup>3</sup>, *Microdesmis keayana*<sup>3</sup> and *Mareya micrantha*<sup>1</sup>.

The evidence for the distribution of chimpanzees showed a strong spatial preference for the highest parts of the forest, at the limit between altitude grasslands and forested areas. However, evidence of chimpanzees was



**Fig. 2** Distribution of chimpanzee-related observations in Gouéla area. Black areas = altitude grasslands; dark grey and light grey areas = forested and non-forested zones of the reserve's core area. N = nesting site; F = chimpanzee faeces; T = animal trail on which evidence of chimpanzees was observed, V = chimpanzee vocalizations heard and S = other isolated chimpanzee tracks. Gouéla II, Taï and G'bié = base camps. Dotted line = walked track in Déré.

also seen in the lower parts of the forest (450-720 m high), but these were rare and relatively old.

In general, the Gouéla forest is well-protected from clearing. Nevertheless, an important poaching pressure was revealed through the observation of 27 snares and numerous cartridges, 3 encounters with hunters in the integrally protected area and 49 gunshots heard during 23 nights out of the 49 days of field activity.

Taken together, these results suggest that a relatively important group of chimpanzees was sporadically exploiting the highest and most remote part of the Gouéla area at the time of this survey. They were believed to be highly mobile in their search for scarce plant-food resources or in their avoidance of hunters.

### **Results for the Déré forest**

About 110 kilometres were walked within the limits of the Déré forest, and only a single piece of evidence of the presence of chimpanzees was seen in 13 days. The valley of Cavally as well as the north part of the forest has been totally cleared, including gallery forests, and currently consists of a mix of fallow lands and field under cultivation. The western part of the Cavally River was broadly surveyed, but no chimpanzee tracks were observed, which corroborated the local people's statements: "chimpanzees have left Déré, we cannot hear nor see them anymore". The eastern part of the Cavally River and particularly south of the Déré River is occupied by Ivorian rebel forces, which prevented us from entering the forest. However, discreet continuation of reconnaissance allowed observation of the only evidence of chimpanzee presence in the entire Déré Forest. This consisted of a very old bed built about 25 meters high in a tree of the species *Aningueria altissima*, close to the southeast border with Côte d'Ivoire. According to the local people, chimpanzees would come annually from Côte d'Ivoire at the end of the rainy season. This would be congruent with the age of the observed bed.

Logging activities conducted in Déré in 1999-2000 have created deep penetration routes that have later favoured human encroachment and settlement, which led to drastic annual clearance for cultivation. Today, even if some patches of forest containing huge and various tree

species can still be found, the fragmentation is so extensive that the whole ecosystem is in a critical situation.

Ongoing field work should provide further data and longitudinal records on habitat utilization, ranging patterns and conservational status of chimpanzees in the Nimba Mountain Biosphere Reserve.

**Acknowledgments.** The present research was financially supported by MEXT (#16002001) addressed to Tetsuro Matsuzawa. Thanks are due to the field guides in Guinea: Michel Zogbélémou, Langamé, Mamoudou and Papa Soromou for their essential assistance, as well as Laura Martinez and Andrew MacIntosh for their comments in writing this paper.

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<NOTE>

## **First Assessment of Chimpanzee (*Pan troglodytes troglodytes*) density and bedding behaviour in the Pongara National Park, Gabon**

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## INTRODUCTION

The population size of *Pan troglodytes* in Equatorial Africa is estimated at 105,000 chimpanzees<sup>1</sup>. In 1984, Tutin and Fernandez<sup>2</sup> obtained an estimation of 64,000±13,000 chimpanzees for the Gabonese population, while in 2000 Walsh *et al.*<sup>3</sup> observed a decline of 56% based on this previous national census. Unfortunately, those estimations are based on few studies and may not reveal the real population status.

The chimpanzee population (*Pan troglodytes troglodytes*) of the Pongara National Park was first documented in 2006<sup>4</sup>. This Park was created in 2002 especially to protect the egg-laying sites of the leatherback turtles (*Dermochelys coriacea*), but contains also a wide variety of mammal species, including chimpanzees. Gorillas seem to be absent, which was confirmed by the villagers inhabiting the park.

## METHODS

### Study area

Pongara National Park (PNP) in Gabon is at only 15 km from Libreville, on the other bank of the Komo Estuary (Fig. 1). This park of 929 km<sup>2</sup> is formed by the Atlantic coastal forest of the Pongara peninsula to the west, and by

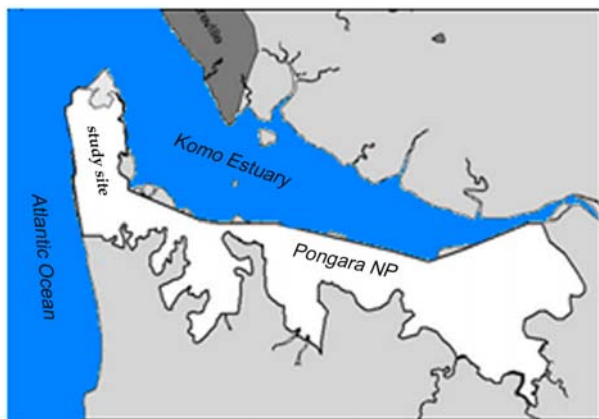


Fig. 1 Pongara National Park map.

the swamp flooded forest along the south bank of the Komo River. Small savannahs are dispersed into the terra firma forest. The climate is characterized by a dry season from June to September and a rainy season from October to May, with a drier period in January and February. The mean annual rainfall is 3,000 mm and the mean temperature is 26°C. The topography is relatively flat with the highest point culminating at about 40 m above sea level<sup>5</sup>.

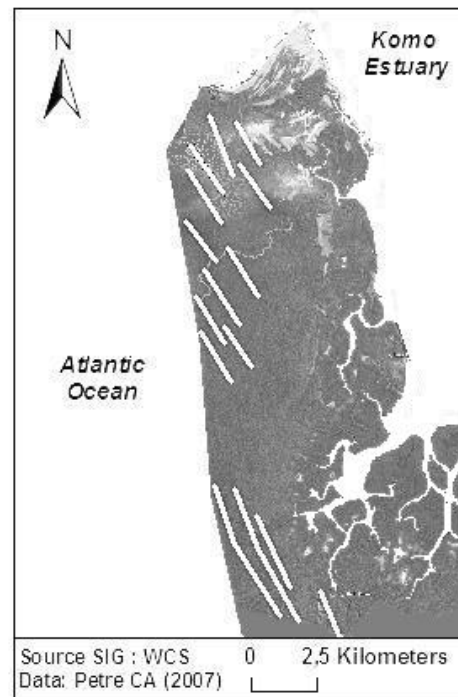


Fig. 2 Sampling design of the terra firma forest.

### Transects

Data were collected from January to April 2007. To assess the chimpanzee density, we opted for the Standing Crop Bed (=Nest) Count Method as the best compromise between the time and means available and the precision required for this study<sup>6,7,8</sup>. A total of 41.16 km in 17 line transects (mean length: 2.4 km; [1.8-3.3]) distant of at least 500 m from each other, were covered in the terra firma of the Pongara peninsula (Fig. 2). They were walked once following fix compass bearing adjusted on S-W 150°. All ape and human signs encountered along transects, as well as vegetation changes were noted and mapped using a

Garmin GPSmap 60 Cx. We considered arbitrarily as a group of beds all the beds of the same age in a circle of 30 m diameter. For each group of beds, we noted the GPS coordinates, the number of beds, their perpendicular distance from the transect, their age, height, diameter, their type of construction, the tree species in which they were built, and the habitat type and characteristics of the site.

### Chimpanzee bed

We used four ages classification based on the bed decomposition state<sup>2</sup>:

- “Fresh”: the vegetation is green, sometimes with moist dung present and gorilla/chimpanzee odour,
- “Recent”: the vegetation is drier but the leaves remain in majority green,
- “Old”: the vegetation is dead but the bed shape remains distinguishable,
- “Very old”: no more leaves on stems and the bed is deformed and incomplete.

We distinguished two types of bed construction:

- “Tree bed”: the bed is constructed in tree, exclusively with woody materials,
- “Liana bed”: the bed is constructed in lianas, exclusively with woody materials.

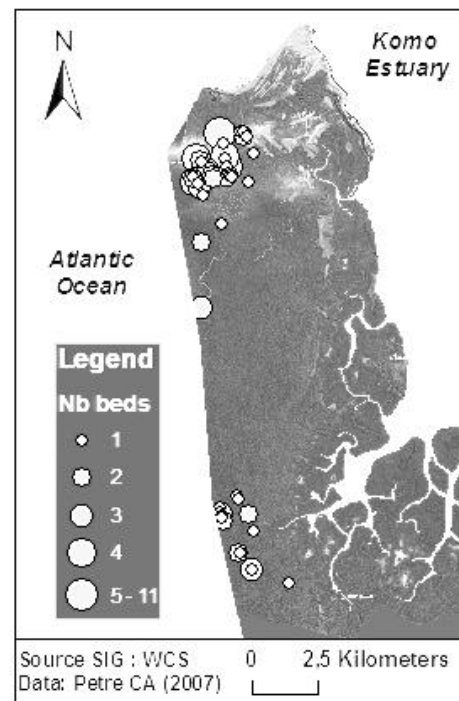
### Density assessment

The line transect census was carried out using the method described by Tutin and Fernandez<sup>2</sup>. Assuming that every weaned chimpanzee build a new bed every night, the density of weaned individuals is:

$$D = n \times \text{mean bed group size} / (2wL \times \text{mean bed life span})$$

Where n = total number of bed group; w = effective strip width; L = total transect length.

The DISTANCE sampling program (5.0 version) uses the perpendicular distances of the first bed seen of the



**Fig. 3** Repartition of the chimpanzees bedding sites in the study area.

bed groups from the transect line to determine a detection function and the effective strip width (w). The « Half-Normal » model adjusted by the « Cosines » function was used to fit bed group data. In order to obtain a better fitting of the detection function to the bed group, 5% of the data corresponding to the highest perpendicular distances were taken out<sup>9</sup>. We also reduced the density calculated by 20% to take into account the day bedding activity of the chimpanzee<sup>10,11</sup>.

## RESULTS

### Chimpanzee density and bed distribution

Along the transects, we encountered 51 bed groups, for a total of 101 beds (Fig. 3). After the 5% data truncation, DISTANCE sampling program has calculated a

**Table 1** Details of the density assessment by Distance Sampling Program.

Object	n	ESW	MGS	r	CV(r)	IC 95% (r)	D	CV(D)	IC 95% (D)
Site	48	13.49	-	1.17	0.31	0.61-2.22	48.137	0.385	19.873-90.179
Nid	98	-	-	2.38	-	-	95.310	0.398	42.632-201.548
Ind.	-	-	2.04	-	-	-	0.839	0.398	0.386-1.823

n = number of object, ESW = Effective Strip Width, MGS = mean group size; r = encounter rate (object/km), CV = coefficient of variation, IC = confidence interval, D = density (object/km<sup>2</sup>).



density of 0.839 weaned chimpanzees/km<sup>2</sup>, which becomes 0.671 weaned chimpanzees/km<sup>2</sup> after the reduction of 20% (Table 1).

The clumped distribution of the bed groups shows at least two groups of chimpanzees, each bedding in a different habitat type. The northern chimpanzee's group of the peninsula, which is the largest, beds in what we can describe as an old secondary forest, while the southern group beds in a dense undisturbed forest. Right down the old secondary forest is a stand of open forest with *Podococcus* where no bed was found.

### Bedding behaviour

During the sampling of the terra firma forest ten additional beds were found while walking between transects and were included to determine the bedding behaviour. Among the 111 beds encountered, 4 were built in lianas and 107 in trees, all found at a mean height of

13.4 m [4-34 m]. Their mean diameter was of 50.3± 17.1 cm [20-130 cm], all the bed ages confounded, and 68.9±11.7 cm (n=9, [55-130 cm]) when only fresh and recent beds are taking into account. Their physical characteristics confirmed that all the beds were built by chimpanzees, except a 130 cm wide bed which could meet the gorilla bed criteria.

For the 107 arboreal beds, 92 tree identifications could be done, counting for 21 species. The utilization frequency for bedding varies between the tree species and is not related to the abundance of those trees in the park (0.1<P<0.2, R=0.293, N=21, Rho of Spearman) suggesting that tree species is specifically selected by chimpanzees for bedding (Table 2).

### Human activity

We found a guild of human indices in the area sampled (Table 3). Most of them can be attributed to poaching and show a dichotomized clumped repartition at the surrounding of the arm of the Komo River and of the road crossing the forest from the North-East to the middle-West (Fig. 4).

**Table 3** Human indices met in the Park.

Human indices	N
Traps	21
Fireshots	4
Cases of cartridge	5
Camp of Poachers	1
Machete cuts	22
Carcass of elephant	1
Chain saw noises	4
Firecamp	1

**Table 2** List of trees used for bed construction and comparison between their frequency of utilization for bedding and their abundance in the Park.

Species	N	Utilization for bedding (%)	Abundance (%)
<i>Anisophyllea purpurascens</i>	6	6.5	3.5
<i>Anthonota macrophylla</i>	2	2.2	7.1
<i>Antidesma vogelianum</i>	1	1.1	1.7
<b><i>Cola nitida</i></b>	14	15.2	2.7
<b><i>Coula edulis</i></b>	21	22.8	3.1
<i>Dacryodes cfr klaineana</i>	1	1.1	3.9
<i>Diospyros iturensis</i>	1	1.1	2.3
<i>Gambeya boukougouensis</i>	3	3.3	1.4
<b><i>Irvingia gabonensis</i></b>	15	16.3	3.3
<i>Maesobotrya klaineana</i>	1	1.1	3.7
<i>Maranthes gabunensis</i>	7	7.3	0.4
<i>Maranthes glabra</i>	3	3.3	1.6
<i>Maranthes</i> sp.	2	2.2	0.2
<i>Oncoba glauca</i>	1	1.1	0.8
<i>Pentaclethra macrophylla</i>	3	3.3	1.7
<i>Phyllocosmus calothyrsus</i>	1	1.1	2.3
<i>Plagiostyles africana</i>	2	2.2	0.4
<i>Rhabdophyllum arnoldianum</i>	1	1.1	0.0
<i>Scottellia</i> sp.	3	3.3	2.7
<i>Scyphocephalum mammii</i>	2	2.2	1.4
<i>Staudtia gabonensis</i>	2	2.2	1.9

### DISCUSSION

The chimpanzee population of the Pongara National Park lives in density comparable with other Gabonese and Central African parks more isolated from towns (Table 4). We have to note, however, that certain factors may bias the density calculated. Chimpanzees are known to re-use beds<sup>8</sup> which reduces the density calculated, and the bed life span used was calculated in a forest with different environmental conditions than in the Atlantic coastal forest. The higher humidity level and rainfall of the Atlantic coastal forest make the organic matter disappear faster, then the mean bed life span might be smaller and the density calculated higher.

The stand of open forest with *Podococcus* does not seem to be favourable for bedding, which could be related in part to the physical characteristics of this type of forest. The trees are very tall with their first branches standing high, the undergrowth is very open and the tree diversity could be not appropriate for chimpanzees that seem to select trees for bed construction. This selection was documented in other studies<sup>12,13</sup> and is believed to be based on tree's physical factors as the foliage density<sup>13</sup> and the tree architecture. In our case, another factor seems to act in this tree selection: 11 of the 21 bedding tree species identified are known to be part of the chimpanzee diet, e.g., *Coula edulis*, *Irvingia gabonensis* and *Cola nitida*. If we admit that these items are really eaten by chimpanzees of the Pongara NP, the proportion of beds observed in trees identified in other sites as "food trees" rises to 71.9%, which is statistically more than the proportion expected by chance ( $\chi^2=9.391$ ,  $df=1$ ,  $P<0.05$ ). The tree selection could be then related as well to feeding. The predominant factors that influence the bedding-site selection in the dense evergreen forest of Pongara could be the vegetation type and the edible food availability as described in the Kalinzu Forest Reserve<sup>14</sup>.

Despite the postulate stating that ape populations decline with the proximity from big towns such as

**Table 4** Density of weaned chimpanzees in *terra firma* forest in different sites of Central Africa.

Site	r (bed/km)	D (ind./km <sup>2</sup> )
<b>CAR</b>		
Ngotto <sup>15</sup>	1.55	0.44 (NA)
<b>CAMEROON</b>		
Dja Reserve <sup>17</sup>	2.10	0.79 (0.60-1.04) <sup>a</sup>
Campo Forest <sup>18</sup>	NA	(0.63-0.78) <sup>b</sup>
Ma'an Forest <sup>18</sup>	NA	(0.8-1.0) <sup>b</sup>
<b>CONGO</b>		
Odzala NP <sup>19</sup>	13.26	2.2 (1.5-3.0) <sup>b</sup>
Lac Télé Community Reserve <sup>16</sup>	0.65	0.1 (0.0-0.1) <sup>b</sup>
<b>GABON</b>		
Lopé NP <sup>20</sup>	NA	NA (0.32-0.70) <sup>b</sup>
Petit Loango <sup>21</sup>	NA	0.78 (0.65-0.94) <sup>b</sup>
<b>Pongara NP (this study)</b>	<b>2.38</b>	<b>0.67 (NA)</b>
Gabonese territory <sup>2</sup>	2.05	0.49 (0-1.78) <sup>b</sup>

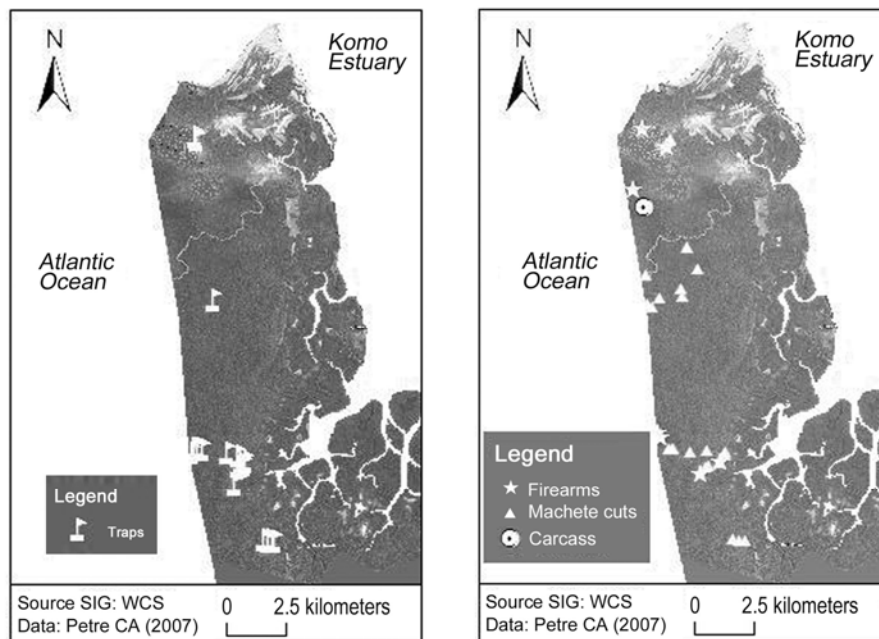
Values for Gabonese territory include all types of habitats.

NA: not available.

a: 95% confidence interval.

b: mean density (minimum and maximum mean density for different habitats).

Libreville<sup>2,3</sup> and despite the encounter rate of poaching signs, the density we found shows that this chimpanzee population has well resisted the human pressure (as well as stochastic events since this peninsular population of chimpanzee is quite geographically isolated). This emphasizes the urgent need to develop a management plan for the Park, including a specific chimpanzee protection



**Fig. 4** Repartition of the Human indices in the study area.

program and a law enforcement plan that would aim at penalising illegal activities in the Park. We propose that this preliminary study serve as the basis for a chimpanzee monitoring program in Pongara NP and to extend the sampling area to the swamp forest which could shelter other groups of chimpanzees or even gorillas<sup>15,16,17</sup>.

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## <NOTE>

### Assessment of the planted trees in Green Corridor Project

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The Bossou chimpanzees were first described by French and Dutch scientists<sup>4,5</sup>. Since 1976, Japanese scientists and then an international team (KUPRI-International) have been studying the chimpanzees at Bossou<sup>6,9</sup>. The community is at present isolated from the neighboring groups in the Nimba Mountains. In 1982, Sugiyama noted the arrival of a single immigrant male to Bossou, yet no comparable additions to the group have been observed since. The number of chimpanzees in Bossou has been stable, about 20, for the last 3 decades<sup>8</sup>. However, the number suddenly decreased to 13 (as of September 2007), mainly

due to the death caused by an epidemic respiratory disease in the November of 2003<sup>7</sup>. We can therefore infer the potentiality for serious genetic problems arising in the near future. For the future of the Bossou community, it is necessary to promote the reforestation of corridors connecting the neighboring communities.

The nearest community of chimpanzees lives in the Nimba Mountains, at a distance of approximately 10 km from the center of Bossou to the ridge. Savanna vegetation extends along a radius of at least 4 km between Bossou and Seringbara, the nearest area in the Nimba Mountains, where we identified at least one community of chimpanzees<sup>2,3</sup>. In January 1997, the Japanese researchers in collaboration with the local Manon people started creating “Green Corridor (Corridor Vert)” by planting trees in the savanna area along a 300m wide 4 km long stretch of land extending between Bossou to Seringbara. The corridor should promote the migration between the two groups.

The initial effort was to create a small botanical garden (Projet Petite Jardin), as a pilot attempt of the Green Corridor Project. The garden was constructed on 0.36 ha (60m x 60m) in the peripheral savanna area of chimpanzee habitat. We first cut back poaeous plant species and then planted nursery trees from 28 species, all of which can be found in the core area of the chimpanzees’ habitat of Bossou<sup>10,11</sup>. The total number of the trees planted was 250. One and half years later, in July, 1998, the trees in the garden were inspected and the number of live trees had decreased to 125, which means that 50 % of the planted trees had survived<sup>1</sup>.

In January 2005, a second inspection was carried out 8 years after initiation of the project. During the 8 years, there was no further attempt to planting trees in that same plot. In the assessment, the number of surviving trees had decreased to 62, which means that based on the initial number of planted trees 25 % had survived. We identified 9 species that survived in the savanna during the course of the 8 years (Table 1). Among them, the most successful ones were *Uapaca heudelotii*, and then *Parkia bicolor*. The tallest



**Fig. 1** Young trees were grown in the tree nursery, where each sapling was kept in a plastic sac. Green Corridor Project established an unique way of utilizing chimpanzee faeces to grow the samplings. Photo by T. Humle.

tree was a tree of *Parkia bicolor* (#PJ-48), 9.3 m in height, 3.8 cm in DBH, and 5m in radius. The second tallest tree was a tree of *Uapaca heudelotii* (#PJ-30), 9.2 m in height, 12.7 cm in DBH, and 5m in radius.

In addition to the planted trees, we counted the total number of trees taller than 30 cm to find another 386 trees and saplings that had not been planted by us. These trees had grown naturally in the plot: The seeds were most likely brought by the wind, animals, and/or birds. In total, after 8 years, there were 448 trees and saplings present in this plot. This means that 86.2% of the trees and saplings had resulted from a natural regeneration process during this period. Among the naturally grown trees and saplings, we identified 30 species, a high diversity of tree species in such a small surface area. Among them, the following three species were dominant: *Harungana madagascariensis* (n=55), *Nauclea latifolia* (n=55), *Dychrostachys glomerata* (n=40). These species are pioneer tree species.

Since our initial efforts 8 years ago, we can make

**Table 1** Tree species that survived in the savanna.

Scientific name	Family	Manon name	Type	Part	No. Trees
<i>Uapaca heudelotii</i>	Euphorbiaceae	Sonna	F	Fr	35
<i>Parkia bicolor</i>	Mimosaceae	Komi	Fs, Fd	Fr	9
<i>Craterispermum codatum</i>	Rubiaceae	Gbeke-guan	Fs	Ec	5
<i>Craterispermum laurinum</i>	Rubiaceae	Gbeke	Fs	Ec	3
<i>Albizia zygia</i>	Mimosaceae	Kpaan-tii	Fs	Gm, Fl	6
<i>Blighia welwitschii</i>	Sapindaceae	Glain-puru	F	Fr	1
<i>Spondias mombin</i>	Anacardiaceae	Buna	Fs	Fr	1
<i>Vismia guineensis</i>	Hypericaceae	Bla-loro	Fs	na	1
<i>Vitex oxypticus</i>	Berbenaceae	Bom	F	Fr	1

Notes: Type: Vegetation type, F: Forest, Fs: Secondary and deciduous forest, Fd: Dense forest, Part: The plant part consumed by the chimpanzees, Fr: Fruit, Fl: Flower, EC: Bark, Gm: Gum or resin, na: No record of chimpanzees’ feeding.

the following three conclusions. First, some forest tree species, such as *Uapaca heudelotii*, and *Parkia bicolor*, can survive well when planted in the savanna. This evaluation of the Petit Jardin project has helped us select those tree species for future transplantation that both provide food for the chimpanzees and can thrive in the savanna. Second, we noted a significant natural regeneration process in our pilot savanna plot, which suggests that protecting the area from browsing animals and preventing bush fires can by themselves generate a greater diversity and density of tree species than transplanting nursery grown trees alone (We had the bush fires at least three times in the past 10 years, and the last one in February 2007 gave the serious damage on the corridor as a whole). These supplementary activities are therefore crucial for the success of reforestation programs in savanna areas. Third, we found that we can transform the savanna into forest through a reforestation program. Based on our initial attempt in the Petit Jardin, we estimate that in 8 years, we can grow trees reaching close to 10m in height using our method of growing trees in a nursery and transplanting the young trees to the savanna.



**Fig. 2** The savanna was transformed to a secondary forest. You can still recognize the planted *Uapaca heudelotii* trees placed at 5 m interval. Photo by T. Matsuzawa.

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## <NOTE>

### Exploratory-threat behaviors in wild chimpanzees encountering a porcupine

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## INTRODUCTION

To my knowledge, there has been no report on direct interactions between wild chimpanzees and porcupines. This paper reports the observation of an encounter between wild chimpanzees and a crested porcupine (*Hystrix cristata*) in the daytime at Mahale Mountains National Park, Tanzania.

## OBSERVATIONS

At noon on November 22, 2000, while following a group of travelling chimpanzees, I found some chimpanzees resting, with a porcupine near them (12:04). This party of chimpanzees consisted of 1 adult female (FT), 3 adolescent males (PM, PR, CD), 1 juvenile female (IV), and 2 infant females (FV, IM). The porcupine kept still on the ground and took a defensive posture, with its head under a dense thicket of vines and the quills on its back extending into the open space (Fig. 1).

The chimpanzees stayed about 2–7m from the porcupine. At 12:06, a 9-year-old male (PR) approached the porcupine from behind and hit the ground 1 m behind it with a small stick (1 cm diameter by 20 cm long). At the same time, an 8-year-old male (CD) shook the thicket 3 m above the porcupine. Then, PR sat 1.5 m behind the porcupine, broke another nearby branch (3 cm diameter by 70 cm long), extended it toward the porcupine cautiously, and then strongly hit the ground with it right behind the porcupine 6 times (12:07). The branch never touched the body or quills of the porcupine, but the porcupine slightly projected its quills outward and spread them open. PR lay about 1 m behind the porcupine with his belly on the ground and stared at it for a while (Fig. 2), and finally he



Fig. 1 A porcupine in a defensive posture.



Fig. 2 PR (right) staring at the porcupine from behind.

left the site (12:08). Then a 2-year-old female (IM) shook the thicket 2.5 m above the porcupine as CD did, and the quills were again slightly extended. At 12:09, an adult female (FT), who sat 2 m from the side of the porcupine, pulled and shook a vine stretched from the thicket around the porcupine. After that, the porcupine turned its head toward FT, and FT barked "Wo! Wo!" and again shook the vine intensely. This made the porcupine return to its original posture, with the head under the thicket, and FT calmed down. A 1-year-old female infant of FT (FV) also watched the porcupine from a distance of about 2 m. At 12:13, a chorus of pant hooting occurred around the site, and the porcupine again made its quills up and open. At 12:14, the chimpanzees started to leave the site. A 12-year-old male (PM) was once about to pass behind the porcupine but then changed his course, passing in front of the porcupine.

## DISCUSSION

Four out of the seven chimpanzees at the site showed threat-like displays near the porcupine. Aggressive behaviors of chimpanzees toward another species have been observed during hunting<sup>1</sup>, counterattack against a predator<sup>2, 3</sup>, and cross-species play or playful teasing<sup>2, 4</sup>. The threat-like displays observed in this study were not considered hunting attempts, since there is no record of chimpanzees hunting porcupines<sup>1</sup> and the displays were not as vigorous or the chimpanzees as excited as during genuine hunting. These displays were not a counterattack against a predator because the porcupine is herbivorous and in this case assumed a defensive posture throughout the encounter. These displays were more likely playful

teasing; however, the chimpanzees seemed to engage in this behavior not simply for enjoyment. Rather, the chimpanzees seemed a little nervous and careful about the potential danger: They usually remained several meters from the porcupine, they used sticks or vines instead of touching or biting directly, and they did not show play face nor emit play panting (cf. 4, 5). Despite their caution, the chimpanzees intentionally took actions toward the porcupine, which kept still. These ambivalent behavior patterns suggest that their threat-like displays should be more appropriately regarded as "exploratory-threat behaviors," by which chimpanzees tried to elicit some reactions from the porcupine to learn whether it was dangerous or how it might be dangerous.

Since the porcupine is a nocturnal animal, it is probable that chimpanzees rarely encounter this animal and know little about it. This may be one of the reasons why chimpanzees engaged in exploratory behaviors toward the porcupine even though they were careful about the potential danger. The fact that not only immature chimpanzees but also the adult engaged in exploratory behaviors further suggests that encounters with porcupines are very rare for the M group chimpanzees of Mahale.

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<NOTE>

## Note on a subcutaneous tumor found among wild chimpanzees

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Wild chimpanzees are known to suffer from skin diseases. Goodall<sup>1</sup> described ulcers, sores, abscesses, rashes and fungus disease developed in Gombe chimpanzees. Nishida et al.<sup>2</sup> reported a dermatophytosis in the previous issue of PAN. For more than 20 years, we have noticed that chimpanzees of the Mahale Mountains National Park, Tanzania, occasionally develop a kind of subcutaneous tumor in their lower abdomen. Since Goodall's book (pp.95-96) did not appear to describe this skin disease, we report here the general characteristics of the tumor.

These tumors have a hemisphere-like structure and are approximately the size of a ping-pong ball (Fig. 1). Both males and females and both aged and young individuals become afflicted with this condition, although most victims have been infants. Individuals exhibited no extraordinary behavior, such as taking action to avoid hitting the swollen part on tree trunks, while they were

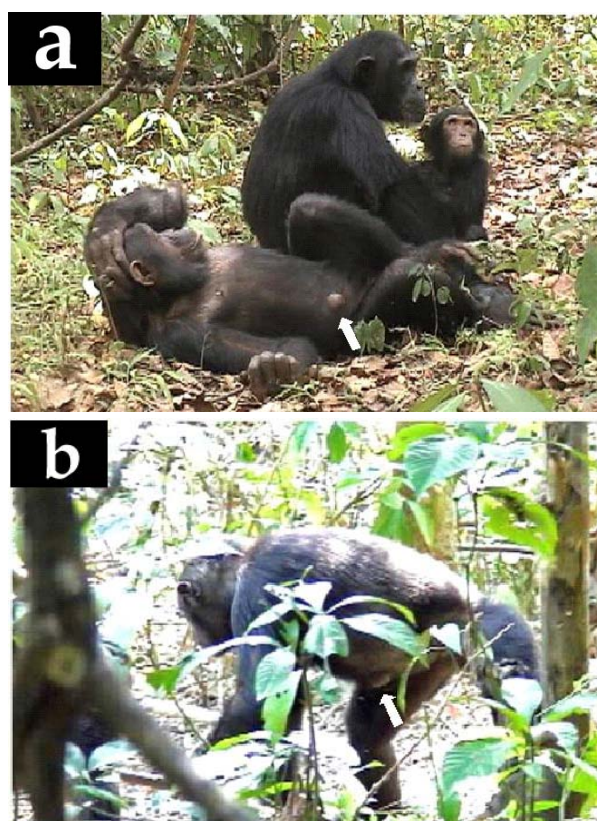


Fig. 1 Subcutaneous tumors. a: Orion's case. b: Fuji's case.

suffering from the tumor. Moreover, youngsters having a tumor did not refrain from wrestling with their playmates. Furthermore, other chimpanzees appeared to pay no special attention to the victim or the affected body part.

TN observed M-group chimpanzees during six periods: Aug. 9 to Oct. 13, 1999; Sept. 23 to Oct. 31, 2000; Sept. 5 to Oct. 3, 2001; Sept. 26 to Nov. 12, 2002; Aug. 16 to Sept. 22, 2003; Aug. 13 to Sept. 15, 2004 and Sept. 22 to Oct. 18, 2005. SF, TK and AI observed them from Dec. 23, 2004 to Feb. 21, 2005, from June 20 to Oct. 20 2007, and from Aug. 10 to Dec. 22, 2007, respectively. The dry season spans from mid-May to mid-October in Mahale, so our study periods were heavily biased to the dry season.

Table 1 summarizes all observations of the tumor during these periods. The tumor occurred in both the dry and rainy season. Orion has continuously exhibited the tumor for 7 years. Gwekulo has suffered from the tumor for more than 10 years, since she was earlier observed to have the tumor outside of the above observation periods (see below). However, symptoms disappeared among some individuals. Sometimes, we find close relatives, who travel together most of the time, sharing the same disease. For example, Orion and Oscar are maternal brothers as well as maternal uncles of Rubicon and, moreover, Ako is Acadia's mother.

This type of tumor might be benign because we have not confirmed the subsequent deaths of victims. However, it could sometimes be a serious condition for them: Once (outside of the periods above) TN observed that an old female, Gwekulo, had developed a huge tumor that emitted pus from the affected area (Fig. 2). It was not



**Fig. 2** It is likely that Gwekulo had a secondarily infected boil on the subcutaneous tumor.

**Table 1** Subcutaneous tumor recorded in M-group chimpanzees (1999-2007)

Year	Dates	Victim	Sex	Age in years	Notes	Observer
1999	Aug.11	Caeser	M	0	belly	TN
	Sept.30-Oct.8	Acadia	F	1	upper belly	TN
	Sept.30	Ako	F	18	3 parts in belly	TN
2000	Oct.4	Rubicon	F	2	left side of belly	TN
	Oct.4	Orion	M	9	belly	TN
2001	Sept.9	Oscar	M	3	left side of belly	TN
	Sept.26	Orion	M	10	right side of belly	TN
2002	Nov.9	Orion	M	11	belly: 6 cm in diameter	TN
2005	Feb.7	Wakusi	F	*44	lower belly	SF
	Oct.18	Fuji	F	*14	belly	TN
	Oct.18	Orion	M	14	right belly	TN
2007	Aug.23	Acadia	F	9	lower right belly: 2 cm in diameter	TK
	Aug.30	Orion	M	16	right belly	TK
	Sept.21-Oct.6	Emory	M	6	upper belly	TK & AI
	Oct.9	Gwekulo	F	*46	right belly	TK

\*presumed.

unlike the kind of tropical ulcer that human residents of the tropics suffer from. Gwekulo's case might be due to a secondary infection. Among humans, benign tumors<sup>3</sup> such as an epidermoid cyst and lipoma resemble the one reported here. In addition, it is known that similar nodule is formed in the body when humans are infected with parasites such as *Onchocerca volvulus*, *Sparganum mansoni*, *Tenia solium* and *Cysticerci cellulosa*<sup>4</sup>. However, it is impossible for us to identify the disease without the cytodagnosis.

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