<NOTE>

Chimpanzees at Semliki Ignore Oil Palms

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INTRODUCTION

Chimpanzee (*Pan troglodytes*) predation on oil palms (*Elaeis guineensis*) varies from essential to non-existent[1,2]. At Gombe, in Tanzania, chimpanzees eat the pericarp of the fruit but discard the seed ('nut') containing the kernel; this foodstuff is the most frequently eaten item in their diet. At Mahale, also on the eastern shore of Lake Tanganyika, in Tanzania, the chimpanzees ignore all parts of the oil palm. However at Bossou, in Guinea, the apes consume the pericarp and pith, and use stone as hammer and anvil to crack open the dried fruit-shell, in order to consume the kernel. Bossou chimpanzees also show 'pestle-pounding', in which the detached petiole of a palm leaf is used to pulverize the apical meristem of an oil palm, before consumption.

The aim of this study was to see where on the spectrum of exploitation is the Semliki semi-habituated population of East African chimpanzees, as compared with Central[3] and West African populations[4–7]. By regular monitoring and field experiment, we sought to test three hypotheses: 1) Oil palms are absent or unproductive at Semliki; 2) Raw materials for nut-cracking are absent or unsuitable at Semliki; 3) Oil palms and raw materials are

present and suitable, but the chimpanzees lack the cultural knowledge to make use of them.

METHODS

We studied the chimpanzees of Toro-Semliki Wildlife Reserve, Uganda[8], recording both ecological and ethological data. We searched opportunistically and non-randomly for oil palms within the home range of the chimpanzees; searching was biased toward the vicinity of major trails used by both apes and researchers. Oil palms were not randomly dispersed, but instead occurred in groves (patches) of unknown origin; in this study we found such four groves. When we found an oil palm, it was described in terms of girth, height and morphology. Its location was noted by GPS and it was marked with plastic tape bearing basic information for identification. We cleared undergrowth and raked clean debris from an area of 5 m radius from the trunk, sufficient to be able to record fallen fruit and signs of predators visiting the tree, e.g. foot or knuckle prints.

Whenever we passed by, on an occasional, non-systematic basis, we monitored each palm's status, no more than once daily. We noted its phenological status, e.g. fruiting, and any signs of predation, e.g. chewed fruits, stripped fronds, etc. Once data were taken, the area around the tree was swept clear again.

At each of the four groves, we assessed availability of potential hammers and anvils by running four10-m × 1-m strip-transects from a central point in the grove in each of the cardinal directions (N, E, S, W). We recorded portable stones or wooden branches/sticks ('clubs') on the surface as potential hammers, and embedded stones, exposed tree roots, or fallen logs as potential anvils. For each stone, we recorded weight (to nearest 10 g), and length, width, and height (to nearest 1 cm). Stones weighing less than 200 g were ignored, as were small, unsuitable sticks or logs. We noted type of stone, when known, and stones were crudely classified as one of three shapes: sphere, pyramid, rectangular solid.

After a month of monitoring the palms, we devised an intervention in which we placed stones suitable to act as hammer and anvil at the base of the largest palm in each grove. Stones were chosen to match features reported from sites where chimpanzees crack nuts, such as Bossou. Nearby, we placed both fresh and dry nuts, and thereafter checked to see if the tools had been moved or the nuts cracked. Later, we placed nuts directly on the 'anvil' stone with hammer close by; that is, we tried to 'scaffold' the situation to encourage processing of the nuts.

RESULTS

Over the course of a 165-day field season, from 28 May to 8 Nov. 2008, we found 16 oil palm trees along the trail system in the Mugiri River valley. These ranged from a solitary tree to a grove of seven trees, making four groves in all (with the other three groves numbering three and four trees). To monitor the palms' status, we checked on them periodically, so that on average, each tree was visited 42 times (range: 12–69 visits), thus on average each tree was visited every 4 days (range: 2–14 days).

All palms had dried and de-husked nuts underneath their canopies. We did not try to count the total number of nuts, but most of them were empty shells, having been preyed upon by beetles (probably Bruchidae). When we collected and cracked intact nuts, they proved to be edible and indistinguishable from nuts tasted elsewhere.

Four of the palms bore fresh fruit during the study, in two of the four groves. They were the only palms of more than 10 m height (median: 13.5, range: 10–14 m) and girths of more than 100 cm (median: 117, range: 111–142). Their bright orange and yellow colouring made the fresh nuts conspicuous, and we counted each batch found on the ground, at each visit. One grove of four palms yielded fresh nuts in a season that lasted at least from 23 June to 16 July (on 15 visits); another grove of seven palms yielded nuts from 9 July to 18 Sept. (on nine visits). In the former case, the mean number of fresh nuts per visit was 17 (range: 1–61 fruits); the latter case the mean was 4 (range: 1–6 fruits). Found nuts were in one of three states: intact, chewed, or cracked/split open. So, who were the consumers? Several times we encountered monkeys and palm nut vultures (*Gypohierax angoloensis*) in the palm canopy. We found no indirect signs of chimpanzees, but did find footprints of suids, probably bushpig (*Potamochoerus larvatus*).

None of the palms suffered feeding damage to any other part of the tree, including the fronds (leaves). This contrasts markedly with another palm species, *Phoenix reclinata*, the pith of which the Semliki chimpanzees ate daily, leaving tell-tale zigzag-shaped wadges strewn on the ground.

Potential raw materials were scarce on transects, compared with Lópe, Gabon[3]. Only 16 potential hammers and 7 potential anvils were found in the total of 160 m^2

($4 \times 4 \times 10 m^2$) of transected area, yielding an overall density of 0.1 hammers and 0.04 anvils per metre squared. Moreover, all 16 hammer stones were found in one 5-m stretch of eroding stream-bed. No other hammers or stones bigger than gravel, and no rocky outcrops were found anywhere else in the river valley, except in eroded gullies. The seven wooden anvils were either tree roots (5) or fallen logs (2). However, each grove had several hammer and anvil stones within 25–50 m of the palms, eroding out of gully sides and bottoms.

The 16 potential hammer stones found on transects averaged 317 g (range: 200–530) in weight, and had a mean length of 8 cm (range: 6–11), width of 6 cm (range: 4–7), and height of 4 cm (range: 3–6). A selection of eight stones found nearby in streambeds was bigger: mean weight: 822 g, length: 11 cm, width: 8.5 cm, height: 6 cm. Too few anvils were measured to yield findings on dimensions. Most stones in both sets were quartz, with which we easily cracked nuts. The most common shape of stone was rectangular solid.

DISCUSSION

We found no evidence that the chimpanzees of Semliki eat oil palms, in any form. So, why do they apparently ignore this valuable, potential food source? The presence of edible, productive and accessible oil palms, growing conveniently close to well-travelled chimpanzee trails provides strong evidence against hypothesis 1. Moreover, the Semliki chimpanzees *do* eat the fruits of *Phoenix reclinata* throughout their range, showing that they are not averse to Palmae fruits.

Although potential hammers and anvils were patchy in distribution, all groves had nearby sources of stones, at least, so that raw material scarcity cannot account for the absence of nut-cracking, at least by lithic elementary technology. Carriage of stones over distances of tens of metres, in order to crack oil palm nuts, is well known in West Africa[9] and would have sufficed at Semliki. Thus, hypothesis 2 cannot account for the absence of nut-cracking.

Absence of oil palm exploitation seems unlikely to be environmentally precluded, thus leaving by exclusion support for hypothesis 3, that absence reflects cultural ignorance on the part of the apes[2,10]. However, conclusions based on absence of evidence are always problematic, so more intensive and extensive study is needed.

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