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## Hunting with tools by Mahale chimpanzees

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Tool-assisted hunting of a mammalian prey by a chimpanzee was first reported from Mahale<sup>1</sup>. This is one of the most frequently cited anecdotes but was often improperly cited in literature, sometimes leading to generalization of this single observation that chimpanzees commonly hunt with tools<sup>2</sup>. Recently, chimpanzees in Fongoli, Senegal, were reported to hunt bushbabies by using sticks as “spears” frequently (22 hunting attempts by 10 individuals with one successful case)<sup>3</sup>. There have been no reports of hunting with tools from other long-term chimpanzee study sites. Then can it be concluded that hunting with tools is habitually performed by chimpanzees only from Fongoli, with only one exceptional case from Mahale?

Here, we discuss the possibility that chimpanzees from Mahale also habitually hunt with tools, although with less frequency than those from Fongoli, by showing

2 additional cases of hunting attempts (one successful case) with tools.

### Observations

#### Squirrel Hunting

On October 4, 1995, at approximately 9:50 AM, an 8-year-old female MG was found poking a stick (approximately 50 cm in length and 3 cm in diameter) into a tree hollow. There were no leaves attached to the stick. She also sometimes inserted her hand into the hollow. At 9:51:27, she took out an immobilized (either dying or already dead) squirrel from the tree hollow. It was assumed that the use of the stick had injured or killed the squirrel. MG put the squirrel in her groin pocket and again inserted her hand into the hollow, but no more squirrels were obtained. The prey seemed like a red-legged sun squirrel (*Heliosciurus rufobrachium*) from the size and color of the body, and a field assistant observed that MG later ate the squirrel.

Interestingly, MG was an adopted daughter of TL who used a tool to hunt a squirrel as reported in a previous study<sup>1</sup>. TL in her adolescence had carried the orphaned MG on her back, allowed MG to sleep in her bed, and took all the possible care of MG<sup>4</sup>; thus, MG had spent most of the time with TL until TL finally emigrated from the M group. Huffman & Kalunde<sup>1</sup> noted that MG begged TL for squirrel meat and obtained some. It could be possible that MG somehow learned tool-assisted hunting from TL.

#### Hyrax Hunting

On October 5, 2004, at 10:05:08 AM, DW (a 16-year-old male) and CD (a 13-year-old male) were looking into the bottom of a large rock (approximately 4 m in width and 1 m in height). There was an approximately 30-cm-diameter cave at the entrance, but the inner part of the cave seemed to be narrow, and its depth could not be judged from outside.

DW and CD alternately inserted their heads or even upper half of their bodies into the cave (Fig. 1) with intermittent vocalizations “*fu fu fu*,” which seemed like half excitement and half anxiety. As DW and CD moved a little away from the cave, a *Cissus* vine (tool 1 in Table



**Fig. 1.** CD (right) inserts his upper body into the stone cave. DW sits nearby and watches.



**Fig. 2.** DW holds a stick (tool 5 in Table 1) in his right hand.



**Fig. 3.** DW inserts the stick into the stone cave.

1) and a stick (tool 2) were observed at the entrance of the cave. At 10:07:03, MC (an 8-year-old male) came to the place; he was interested in the cave but was looking from behind of the other males.

At 10:07:23, CD came back with a *Psychotria* stem (tool 3 in Table 1) in his mouth. The stem still had leaves

attached to it. He then inserted the proximal end of the stem into the cave. After about 1 minute, DW broke off another stem of *Psychotria* (tool 4) and inserted his upper body into the cave while holding the stem. He did not insert the stem, but instead he wielded tool 1 like a whip.

As BB (a 23-year-old beta male) came to the place at 10:09:52 and looked into the cave, DW, CD, and MC came close and showed interest again. BB left and DW and CD again looked into the cave. When AL (a 22-year-old alpha male) appeared, DW gave a pant grunt and CD ran away. As AL looked into the cave from a distance of 0.5 m, CD and MC returned and resumed their interest in the cave. After some time, AL also left.

At 10:12:48, DW picked up a stick (tool 5) from the nearby ground (Fig. 2) and then inserted it into the cave (Fig. 3). DW shook the stick in the cave, poked it into the cave, and sniffed its distal end. When he was poking the stick into the cave, it seemed that something inside the cave moved; as a result, DW and MC winced and moved backward.

After some time with nobody in the front of the cave, DW came back at 10:15:43. He lay on the ground and looked at the cave. After MC and BB visited the cave again and left, OR (a 13-year-old male) came, stared at the cave, and then wielded tool 1. At 10:23:32, DW who remained at the place to the last finally left the place.

A total of 6 males showed interest in the cave, and 3 males used tools. More individuals might have visited the place earlier because some vocalizations were heard prior to the observation. Judging from the excitement and responses of the chimpanzees, it seemed that there was some animal in the cave. A Tongwe assistant stated that the cave was a nest of yellow-spotted rock hyrax (*Heterohyrax brucei*) although we could not confirm their existence. Hyrax is listed as a prey species of Mahale chimpanzees<sup>5</sup>, but there has been no detailed report of hunting of this animal.

### Characteristics of tools

Pruetz & Bertolani<sup>3</sup> argued that chimpanzees in Fongoli used tools as “spears” and not as probes or rousing tools. The Mahale case reported earlier<sup>1</sup> was

**Table 1.** Characteristics of tools used in the attempted hyrax hunting.

Tool #	Material	Length (cm)	Diameter (cm)	User	Source	Usage
1	<i>Cissus oliveri</i> (ligagaja) vine	80	0.5	CD, DW, OR	Not observed	Wielded like a whip in the cave.
2	stick (species not identified)	50	0.8	none	Not observed	Not observed
3	<i>Psychotria peduncularis</i> (lulyolwakape) stem	60	1.0	CD	Freshly broken stem was held in the mouth and transported to the site	Inserted into the cave.
4	<i>Psychotria peduncularis</i> (lulyolwakape) stem	50	1.0	DW	A nearby stem was broken off	Brought to the entrance of the cave (but not used).
5	fallen stick (species not identified)	60	3.0	DW	A nearby stick was picked up.	Shaken and poked in the cave, and the distal end was sniffed.

\*Length and diameter of the tools are estimated from the video image in comparison with the body size of chimpanzees.

characterized as the use of a tool as a rousing tool. Some tools described in our report can also be classified as rousing tools; for example, tool 1 in the hyrax hunting was obviously a rousing tool because the vine was too weak to kill a prey. However, the tool used by MG eventually killed or at least severely injured the squirrel, although it was unknown whether MG intended to use the tool as a “weapon.” Tool 5 used by DW also had potential to kill the prey because of the thickness of the tool and his powerful poking movement, although the attempt was not successful. The sizes of tools used in these hunting episodes are mostly within the range of those of Fongoli hunting tools<sup>3</sup>, but the tool used by MG and tool 5 used by DW were thicker than Fongoli hunting tools. The intentional sharpening of tools by Mahale chimpanzees as in the case of Fongoli chimpanzees was not observed.

If there is some desirable thing in a hollow or in a cave, it is likely that any chimpanzee would insert some object like a stick. If the prey happens to come out, the stick becomes a rousing tool, and if it is killed, the same stick can be said to have worked as a “weapon.”

### Is tool-assisted hunting rare?

Tool-assisted hunting attempts are rarely observed at Mahale with only 3 cases reported to date (including our 2 cases). However, it should be noted that at Mahale,

we seldom see the very moment of capturing of squirrels or hyraxes. Unlike noisy colobus hunting, squirrel hunting is often confirmed only by seeing the carcass afterwards. Therefore, we cannot exclude the possibility that Mahale chimpanzees sometimes used tools in such occasions. Nishida<sup>6</sup> observed that a female in the K group violently inserted and withdrew a stick with a “power grip” in and out of a tree hole (15cm in radius). At that time, mammalian prey did not come to his mind; thus, he assumed that this “expelling tool” was used to expel some kind of insects. He later observed similar behaviors by different females (Nishida, personal communication). It can now be considered that such expelling tools were used to hunt small mammals such as squirrels or galagos. In the case of hyrax hunting, since at least 6 individuals quickly showed interest in the rock cave, it seems unlikely that it was their first attempt to hunt hyrax in this manner.

There are 2 possible reasons why tool-assisted hunting has not been observed regularly at other study sites, except at Fongoli. One reason is that there are more attractive preys at other sites. In other words, hollow- or cave-dwelling small mammals may be regarded as less preferred prey or may not be regarded as prey at all. MG liked to eat small animals such as squirrels and francolins, but there may be individual differences in such preference. Other individuals may not be so eager to

catch such small animals. The other possible reason is observability. Unlike the savanna vegetation of Fongoli, dense forest vegetation of most chimpanzee habitats is also likely to prevent observation of tool-assisted hunting. We cannot sometimes see what other individual chimpanzees are doing when they are high up in the adjacent tree. Furthermore, in a majority of study sites, females and immature individuals have been less observed than males, especially when they are away from males; thus, there is a possibility that solitary and silent hunting attempts by such individuals may have been missed at other study sites.

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