

FURTHER MEDICINAL PLANT CONSUMPTION IN WILD CHIMPANZEES?

Hiroyuki TAKASAKI

Serengeti Wildlife Research Institute, Tanzania

Kevin HUNT

Department of Anthropology, University of Michigan

ABSTRACT Leaves of *Lippia plicata* Baker (Verbenaceae) were consumed by an adult female of the M group chimpanzees in the Mahale Mts. National Park, western Tanzania. The leaves were consumed in a manner similar to the leaves of *Aspilia* spp., previously suggested to be used as medicine by Mahale and Gombe chimpanzees. Evidence from bioassay and from African ethnographical and pharmacological records for the use of *Lippia* spp. suggest that the consumption of *L. plicata* by the chimpanzee is also medicinal.

Key Words: *Pan troglodytes schweinfurthii*; *Lippia plicata*; Feeding ecology; Diet; Medicine.

INTRODUCTION

Wrangham & Nishida (1983) described an unusual feeding behavior in wild chimpanzees (*Pan troglodytes schweinfurthii*) at the Gombe Stream and Mahale Mountains National Parks in Tanzania. Unlike other leaves eaten by chimpanzees, leaves of *Aspilia mossambicensis* (Oliv.) Wild, *A. pluriseta* O. Hoffm., and *A. rudis* Oliv. & Hiern (Compositae) are eaten singly, very slowly, and are swallowed whole (Wrangham & Nishida, 1983; Nishida et al., 1983). The peculiar manner of consumption led them to suggest that they might have medicinal effects (Wrangham & Nishida, 1983). Subsequent analysis confirmed that *Aspilia* spp. leaves contain a strong antibiotic, thiarubrine A (Rodriguez et al., 1985). This brief note reports on another possibly medicinal plant species consumed in a similar manner by Mahale chimpanzees.

OBSERVATIONS

On March 9, 1987, the authors observed the female CH of the M group in the Mahale Mountains National Park, Tanzania (30°E, 6°S). She was not cycling, and she carried her dependent 2-year-old infant. The day was cloudy with 100% cloud cover until about 9:00, after which it cleared only slowly. She had slept in an area of transient vegetation from forest to woodland.

At about 7:00, movement in the bed of CH indicated that she had woken; morning defecation and urination were normal. Her infant moved outside the bed to play. At 7:07 her companion, GW, left her bed and moved west. At 7:35, 28 minutes later than GW, CH, carrying her infant, descended from her bed and walked west for

about 100 m in the woodland vegetation. At 7:38 she plucked a leafed stem about 50 cm long from a shrub and sat down. She ate leaves from this stem and from another stem of the same shrub until 7:52.

The method of eating these leaves was peculiar. Holding the stem, she took a leaf into the mouth; then the mouth was opened and closed on the leaf several times. She appeared to suck on the leaf for a few seconds. After about 15 seconds the stem was pulled away leaving the leaf in the mouth. She continued sucking on the leaf for a short period, then swallowed it, apparently without chewing it. This method of consumption was observed for 4 leaves in great detail, and the same procedure was used for 10–15 more leaves, although the consumption of these was not well observed. Neither CH's infant nor GW were seen to eat this plant.

After eating the leaves, she sat without moving for 6 minutes from 7:51 until 7:57; then she moved off to a small tree, climbed up 3 m, made a bed and lay in it. She remained in this bed until 8:17, when GW came near. CH climbed down from the bed, groomed with GW for less than 1 minute, and departed with GW. It was 9:05 when CH ate her next food, the leaves and buds of *Pterocarpus tinctorius* Welw.

The leaves eaten in this manner, however, were not those of *Aspilja* sp. The plant repeatedly eaten was *Lippia plicata* Baker (Verbenaceae: identified via the Tongwe vernacular name; R. Nyundo, pers. comm.; Nishida & Uehara, 1981). The plant has a distinct verbenaceous odor.

An infusion of dried leaves from a flowering shrub of *L. plicata* (40 shredded leaves soaked in 1,000 ml of rainwater for 18 hours at 20–28°C) was prepared for crude bioassay (in roof shade, i.e., not dark during the daytime). Rainwater or stream water, either of which showed no effect, was used for the controls and dilution below. Unfortunately, the organisms tested were not all identified by species. In the *L. plicata* infusion midge larvae (Chironomidae) showed 100% mortality within 24 hours, while last instar mosquito larvae (Culicidae) showed no apparent damage and later metamorphosed into pupae and imagoes. In further tests diluted infusions with the concentration of $1/2^n$ ($n = 0, 1, 2, \dots, 10$) of the original infusion were tested. Dragonfly larvae (Libellulidae) died within 24 hours up to a dilution of $1/16$. Frog eggs (Ranidae) in the gastrula stage died within 24 hours up to a dilution of $1/8$, and in the dilution of $1/16$ only 50% hatched but all died within 24 hours after hatching. Dry yeast (*Saccharomyces cerevisiae*; "Saf-levure" brand, S.I. Lesaffre, France), cultured in 15% (by weight) sugar solution, showed apparent signs of inhibition or retardation of fermentation up to a dilution of $1/16$. However, locally available breeds of green gram (*Phaseolus aureus*) and rice (*Oryza sativa*) showed no apparent abnormality in germination.

DISCUSSION

The peculiar manner of consumption, the length of time used in consuming it, and the feeding rate shown by the chimpanzee for *Lippia plicata* seem to parallel that of *Aspilja* spp. reported by Wrangham & Nishida (1983). The role of these two genera of plants in the diet of chimpanzees may be the same.

L. plicata leaves have been observed to be eaten by chimpanzees only once before at Mahale (also in March; Nishida & Uehara, 1983), where behavioral and ecological studies have continued for over 22 years. The manner of consumption, the apparent sickness of CH both before and after eating *L. plicata*, and the fact that the present case was not the first but the second observed consumption of the plant suggest that the chimpanzee's consumption of the plant was not simply the testing of a new food item. The possibility that this plant was consumed only as "rough-surfaced leaves" (Nishida et al., 1983) is deemed unlikely as well. *L. plicata* flowers from February to July, and the consumption of this plant by Mahale chimpanzees may be restricted to this flowering season. In March, the chimpanzees of Mahale often move singly or in small groups, and are, therefore, observed less often by researchers (Nishida, 1974); this may explain why *L. plicata* consumption has been observed only twice.

Local Tongwe informants (Wamikambi, pers. comm.; R. Kasakampe, pers. comm.) described a medicinal use for *L. plicata*: the leaves are crushed, soaked in water, and the infusion is administered as an enema for the treatment of stomach/bellyache (one term in the Tongwe language) and menstrual discomfort. Several species of *Lippia* other than *L. plicata* are reported to be used as medicine in various cultures in southern and eastern Africa (e.g. for influenza, measles, malaria, dysenteries, nasal hemorrhage, etc.) and some pharmacological properties (e.g., icterogenic activity) are known (Watt & Gerdina, 1962). The bioassay above showed that *L. plicata* contains some potent biotoxin(s). These also suggest that the consumption of *L. plicata* by wild chimpanzees is medicinal.

Although only preliminary conclusions can be drawn from a single instance of feeding on this particular plant, the similarity of the feeding behavior in consuming *Aspilia* spp. and *Lippia plicata* raises the possibility that chimpanzees may not only use some plants as medicine, but that they also select different plants at different times. Among those recorded to be eaten by chimpanzees at Mahale (Nishida & Uehara, 1983), some other plants may be also used as medicine.

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REFERENCES

- Nishida, T. 1974. Ecology of wild chimpanzees. In (R. Ohtsuka, J. Tanaka, & T. Nishida, eds.) *Human Ecology*, pp. 16-60, Kyoritsu, Tokyo (in Japanese).

- Nishida, T. & S. Uehara (eds.) 1981. Kitongwe names of plants: A preliminary listing. *African Study Monographs* 1: 109-131.
- Nishida, T. & S. Uehara 1983. Natural diet of chimpanzees (*Pan troglodytes schweinfurthii*): Long-term record from the Mahale Mountains, Tanzania. *African Study Monographs* 3: 109-130.
- Nishida, T., R. W. Wrangham, J. Goodall S. & S. Uehara 1983. Local differences in plant-feeding habits of chimpanzees between the Mahale Mountains and Gombe National Park, Tanzania. *Journal of Human Evolution* 12: 467-480.
- Rodriguez, E., M. Aregullin, T. Nishida, S. Uehara, R. W. Wrangham, Z. Abramowski, A. Finlayson, & G. H. N. Towers 1985. Thiarubrine-A, a bioactive constituent of *Aspilia* (Asteraceae) consumed by wild chimpanzees. *Experimentia* 41: 419-420.
- Watt, J. M. & M. Gerdina 1962. *The Medicinal and Poisonous Plants of Southern and Eastern Africa*. E. & S. Livingston, Edinburgh.
- Wrangham, R. W. & T. Nishida 1983. *Aspilia* spp. leaves: A puzzle in the feeding behavior of wild chimpanzees. *Primates* 24(2): 276-282.

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Authors' Names and Addresses: Hiroyuki TAKASAKI, *Serengeti Wildlife Institute, Mahale Mountains Wildlife Research Centre, P.O. Box 1053, Kigoma, Tanzania*; Kevin HUNT, *Department of Anthropology, University of Michigan, Ann Arbor, Michigan 48109, U.S.A.*