PRIMATES, 30(1): 121–125, January 1989

SHORT COMMUNICATION

Ant Eating Behavior of Mountain Gorillas

DAVID P. WATTS
The University of Michigan

ABSTRACT. Eleven cases of feeding on driver ants (*Dorylus* sp.) by mountain gorillas (*Gorilla gorilla beringei*) are described. Ant eating provides the gorillas with more animal protein and other nutrients per unit feeding time than do other forms of insectivory that contribute to their diet, but it is so rare that it is unlikely to be of real nutritional significance. Gorillas obtain ants with their hands and do not use tools. Immature individuals (except infants) ate more ants than did adult females, and silverbacks were not seen to eat ants. These differences are more likely to reflect differences in individual taste and interest in novelty than differences in nutritional strategy. Not all gorillas in the Virungas population eat ants. Intra-population variability may be ecologically contingent, but ant eating appears to be a socially acquired and transmitted taste.

Key Words: Gorillas; Ant eating; Acquired taste.

INTRODUCTION

Mountain gorillas are folivores (WATTS, 1984) whose large body size makes significant reliance on sparsely distributed invertebrates for protein unfeasible. They deliberately eat tiny quantities of invertebrates (FOSSEY & HARCOURT, 1977; WATTS, 1984), but inadvertant ingestion of others along with plant foods is probably more important in satisfying requirements for vitamin B_{12} and other micronutrients absent or scarce in plants (HARCOURT & HARCOURT, 1984). Deliberate insectivory may be a non-necessary side effect of an otherwise adaptive taste (ibid.).

Even large bodied animals such as chimpanzees (MCGREW, 1974, 1979; NISHIDA & HIRAIWA, 1982; GOODALL, 1986) can obtain significant amounts of animal protein by eating social insects, however. Lowland gorillas in Gabon feed regularly on termites (TUTIN & FERNANDEZ, 1983). Termites are absent from mountain gorilla habitat in the Virungas, but HARCOURT and HARCOURT (1984) mention one case of feeding on social ants. Here, 11 cases of gorilla feeding on driver ants (*Dorylus* sp.) are described and the possible significance of this behavior discussed.

METHODS

STUDY SITE

Mountain gorillas have been observed in the Virunga Volcanoes region of Rwanda and Zaïre by fieldworkers based at the Karisoke Research Centre, in Rwanda's Parc National des Volcans, since 1967. Description of the habitat and of the gorillas' diet can be found in SCHALLER (1963), FOSSEY and HARCOURT (1977), WATTS (1984), and VEDDER (1984).

OBSERVATIONS

All observations of ant eating described below were observed during three and a half years of fieldwork in 1984–85 and 1986–87. Whenever a gorilla was seen eating ants, other observations were suspended and records were kept of which individuals participated, how many visits each made to the ants' nest, how long the session lasted, and social behavior associated with ant eating. The biomass of ants eaten was not measured. Also, records were made of excavated nests along gorilla trails.

ECOLOGICAL BACKGROUND

Driver ants live in vast underground colonies that are vigorously defended by soldiers when disturbed. Gorillas feed on defensive swarms and excavate nests to get at more ants. They sometimes encounter foraging columns, but have not been observed to feed on these. Driver ant abundance appears to be inversely related to altitude and they are rare or absent above ca. 2,850 m.

RESULTS

NUMBER OF EPISODES

Two episodes of ant eating were inferred from trail evidence. Six were seen in their entirety (from discovery of ants and/or their nest to departure of the last gorilla from the site), and three were seen in part. All involved Karisoke Group 5; other groups and solitary males studied at Karisoke have not been observed to eat ants.

FEEDING METHODS

Gorillas sometimes discovered nests when they disturbed the ants in the course of other activities. For example, once a silverback uprooted a dead *Vernonia adolfi-fredericii* trunk, at the base of which there was a nest, in a display; immediately ants emerged and most of the gorillas then fed on them. Sometimes a gorilla found an undisturbed nest and started to excavate it when few or no ants were visible. Once, two subadult females ate a few scattered ants individually, then dug in what looked like an unsuccessful attempt to find a nest.

To obtain ants, gorillas rush up to a swarm or reach into a nest and grab a handful, then retreat hastily and frantically eat them from their hand. Their dense hair offers some protection from the ants' fierce bites, but ants that burrow through to the skin cause obvious discomfort. After eating a handful, a gorilla picks individual ants out of its hair with its fingers or lips and eats them and vigorously brushes others onto the ground. Often the gorilla then dashes back to the nest to repeat this sequence. As nest excavation proceeds, individuals thrust their arms into the enlarged opening to get ants. In five of eight observed sessions, the gorillas eventually reached the eggs and pupae, which they ate eagerly.

A gorilla may continue to pick ants out of its hair and respond to bites 15 min after a session ends. Infants are particularly susceptible to the discomfort: during two sessions, infants held by their mother while the latter ate ants whimpered and squirmed in response to bites, and one infant twice left his mother and moved several meters away.

Session Duration and Nest Visit Frequency

The unsuccessful nest search described above lasted only 2 min. Five nest excavations observed in their entirety lasted 8, 10, 22, 30, and 35 min. In those five sessions, the number of visits/handfuls of ants consumed per individual varied from 1–15 ($\bar{x}$ = 6.4 visits, S.D. = 2.9). Each handful contained hundreds of ants and/or eggs and pupae. It can be inferred from data on driver ant dipping by chimpanzees (McGrew, 1974) that the average individual might have ingested 3–10 g per session.

Individual Participation and Age/Sex Class Differences

The number of participants per session varied from 2–12 (N = 6 sessions), with a median of 6. Group size (infants excluded) varied from 12–17 during the study periods. Members of all age/sex classes other than mature silverbacks, of whom there were two in 1984–85 and one in 1985–86, have been seen to eat ants. Silverbacks were present at some sessions but did not join in. Only one infant, the oldest (2.5 years old) and best-coordinated then in the group, ate ants; she participated in three sessions in 1987. All but one of 11 adult females and all juveniles, subadults, and blackbacked males have been seen to eat ants.

Immature individuals—including juveniles, subadult females. and blackbacks (but not infants)—participated in all eight observed sessions, adult females in only five. Immatures visited nests a mean of 9.6 times (S.D. = 3.7) per completely observed session, versus an adult female mean of 3.2 visits (S.D. = 1.5). Immatures made significantly more nest visits than did adult females in each of three sessions in which at least eight individuals participated (Mann-Whitney U tests: $T = 15, n_1 = 5, n_2 = 5, p<0.01$; $T = 12, n_1 = 5, n_2 = 7, p<0.01$; $T = 10, n_1 = 4, n_2 = 4, p<0.05$.)

Aggression and Social Excitement

Gorillas become very excited during ant eating sessions, and even silverbacks who are not eating ants sometimes give chest-beating displays. There were three supplants at the nest site in 1.75 hr during the five sessions observed in their entirety, a high rate compared to supplants over plant foods (Watts, 1985). There were also two screaming outbreaks between adult females who were feeding next to each other, and five times a silverback or blackback hit or dragged another individual during a display.

DISCUSSION

Some mountain gorillas eat ants with striking eagerness and excitement, and the rate of food intake per unit feeding time is higher than for other means of insectivory (Harcourt & Harcourt, 1984). But ant eating is so rare that, like searches for egg cases inside dead plant stems (ibid.), it probably is not nutritionally important. It may differ in this respect from termite eating by lowland gorillas in Gabon (Tutin & Fernandez, 1983), perhaps because driver ants are less abundant in the Karisoke study area than are termites in the Gabon study area (cf., Harcourt & Harcourt, 1984).

Social insects contribute significantly to chimpanzee diets (Wrangham, 1977; Uehara, 1986; Goodall, 1986), and insectivory is probably more important nutritionally to females

than to males (MCGREW, 1974, 1979; GOODALL, 1986; UEHARA, 1986). UEHARA (1986) suggests that some insectivory by chimpanzees is associated with individual tastes and is not nutritionally important. Similarly, ant eating by Karisoke gorillas probably reflects inter-individual differences in taste and learning experience rather than differences between age/sex cl sses in nutritional strategies. One large blackback ate more ants than smaller adult females, which would not be expected on energetic grounds, and continues to do so as he nears physical maturity. More frequent ant eating by younger individuals could reflect their greater interest in novelty (NISHIDA, 1987). A female who has transferred from a group in which ants are not eaten might acquire the taste in adulthood. Female *Simba*, for example, has been observed in four different groups; gorillas in the first three were never seen to eat ants, but she participated in two ant eating sessions after her transfer to Group 5 in 1984.

Intra-population variability in ant eating could result from both ecological and traditional differences, as has been suggested for inter-community variation in insectivory by chimpanzees at Mahale (UEHARA, 1986) and for differences between Mahale and Gombe (MCGREW, 1983). Group 5 often ranges as low as 2,700 m and probably encounters ants more often than do groups that are almost always at higher altitudes. Ant eating is more frequent on the Zaïre side of the Virungas, where gorilla habitat extends down to about 2,100 m (M. CATSIS, pers. comm.). Gorillas that almost never encounter ants may not recognize them as food; *Simba*'s behavior suggests that they are capable of learning to do so when in a new social milieu where others eat ants. The presumed nutritional triviality of ant eating by Virunga gorillas implies that it is a taste that is ecologically contingent but socially acquired and transmitted.

Acknowledgements. I thank L'Office Rwandaise du Tourisme et des Parcs Nationaux for permission to do research in the Parc National des Volcans and Zaïre Park Authorities for permission to work in the Parc des Virungas. I thank the late DIAN FOSSEY for permission to work at Karisoke in 1984–85. Fieldwork in 1984–85 was supported by The L.S.B. Leakey Foundation, The Chicago Zoological Society, The Eppley Foundation for Research, The Wildlife Preservation Trust International, and The World Wildlife Fund U.S. Fieldwork in 1986–87 was sponsored by The Digit Fund. MIKE CATSIS provided stimulating discussion of ant eating by gorillas.

REFERENCES

FOSSEY, D. & A. H. HARCOURT, 1977. Feeding ecology of free-ranging mountain gorillas. In: *Primate Ecology*, T. H. CLUTTON-BROCK (ed.), Academic Press, London, pp. 415–447.

HARCOURT, A. H. & S. A. HARCOURT, 1984. Insectivory by gorillas. *Folia Primatol.*, 43: 229–233.

GOODALL, J., 1986. *The Chimpanzees of Gombe*. Harvard Univ. Press, Cambridge.

MCGREW, W. C., 1974. Tool use by wild chimpanzees in feeding upon driver ants. *J. Human Evol.*, 3: 501–508.

————, 1979. Evolutionary implications of sex differences in chimpanzee predation and tool use. In: *The Great Apes*, D. A. HAMBURG & E. R. MCKOWN (eds.), Benjamin/Cummings, Menlo Park, pp. 441–463.

————, 1983. Animal foods in the diets of wild chimpanzees: why cross-cultural variation? *J. Ethol.*, 1: 46–61.

NISHIDA, T., 1987. Local traditions and cultural transmission. In: *Primate Societies*, B. B. SMUTS, D. L. CHENEY, R. M. SEYFARTH, R. W. WRANGHAM, & T. T. STRUHSAKER (eds.), The Univ. of Chicago Press, Chicago, pp. 462–474.

———— & M. HIRAIWA, 1982. Natural history of a tool using behavior by wild chimpanzees in feeding upon wood-boring ants. *J. Human Evol.*, 11: 73–99.

SCHALLER, G., 1963. *The Mountain Gorilla*. The Univ. of Chicago Press, Chicago.

TUTIN, C. & M. FERNANDEZ, 1983. Gorillas' feeding on termites in Gabon, West Africa. *J. Mammal.*, 64: 530–531.

UEHARA, S., 1986. Sex and group differences in feeding on animals by wild chimpanzees in the Mahale Mountains National Park, Tanzania. *Primates*, 27: 1–13.

VEDDER, A. L., 1984. Movement patterns of a group of free-ranging mountain gorillas (*Gorilla gorilla beringei*) and their relation to food availability. *Amer. J. Primatol.*, 7: 73–88.

WATTS, D. P., 1984. Composition and variability of mountain gorilla diets in the central Virungas. *Amer. J. Primatol.*, 7: 323–356.

————, 1985. Relations between group size and composition and feeding competition in mountain gorilla groups. *Anim. Behav.*, 33: 72–85.

WRANGHAM, R. W., 1977. Feeding behaviour of chimpanzees in Gombe National Park, Tanzania. In: *Primate Ecology*, T. H. CLUTTON-BROCK (ed.), Academic Press, London, pp. 503–538.

—Received *April 4, 1988*; Accepted *June 24, 1988*

Author's Name and Address; DAVID P. WATTS, *Department of Anthropology, The University of Michigan, Ann Arbor, Michigan 48109, U.S.A.*