<table>
<thead>
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<th>Title</th>
<th>Natural Diet of Chimpanzees (Pan troglodytes schweinfurthii): Long-Term Record from the Mahale Mountains, Tanzania</th>
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</thead>
<tbody>
<tr>
<td>Author(s)</td>
<td>NISHIDA, Toshiyuki; UEHARA, Shigeo</td>
</tr>
<tr>
<td>Citation</td>
<td>African Study Monographs (1983), 3: 109-130</td>
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Kyoto University
NATURAL DIET OF CHIMPANZEESE (PAN TROGLODYTES SCHWEINFURTHII):
Long-term Record from the Mahale Mountains, Tanzania

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Department of Anthropology, The University of Tokyo
Shigeo UEHARA
Faculty of General Education, Sapporo University

ABSTRACT All the plant and animal foods recorded to be eaten by wild chimpanzees of Kasoje in the Mahale Mountains, Tanzania between 1965 and 1981 are listed up together with some additional miscellaneous foods. As for the plant foods, the chimpanzees have been confirmed to utilize 328 food items from 198 species (including 8 food items from 6 cultigen species). They also consume 12 species of mammals, 5 species of birds or their eggs (including one domestic species), and more than 15 genera of insects (including at least 25 species). Since drastic inter-annual changes in food composition in the diet of wild chimpanzees exist, only such data collected on the basis of a long-term perspective can reveal their diversified food repertoire.

INTRODUCTION

Feeding habits of wild chimpanzees have received much attention from anthropologists, because they are likely to shed light on the proto-hominid diet (Itani, 1966; Itani & Suzuki, 1967; Suzuki, 1969; Tanner & Zihlman, 1976; Isaac, 1978; Zihlman, 1978; Peters & O'Brien, 1981). This paper lists up all the plant and animal foods observed to be eaten by chimpanzees of Kasoje in the Mahale Mountains, Tanzania and aims to provide archaeologists and paleontologists with fresh field data which would be useful in reconstructing the diet of early hominid as well as to present basic data on the feeding ecology of the chimpanzee.

METHOD

The data on which this paper is based were obtained from multiple field studies conducted by the authors (1965–1981). Although the study covers four unit-groups (B, K, M, & L) of chimpanzees living in the study area, almost all data come from the study of two habituated unit-groups (K & M including roughly 110 chimpanzees in total), and mostly from a single unit-group (K) which has been studied most intensively. Only the species that have been identified scientifically are included in the list. The leaves of the plants which were eaten only as “wadge” are excluded, though they were included in the earlier paper (Nishida, 1974). There are still other unidentified edible fruits, the seeds of which have been found in the chimpanzees’ feces. Therefore, this list is not yet comprehensive. However, it is quite likely that all the important food items have already been collected. Only long-term study can reveal the diversified food repertoire of wild chimpanzees: for example, it is only recent years (1975 and 1977 respectively) that Toddalia and Minusops fruits were known to be eaten much by chimpanzees. Food composition changes from year to year, and some food almost neglected in one year might be harvested in great amounts in another year.

When available, the maximal length of feeding bout and the number of bouts in which the bout-lengths were measured are reported here, so that readers may have a general idea as to
the degree of importance of the specific food item in the total food repertoire. Such data were
taken from only recent field studies (Nishida; Oct. 1973–Jan. 1974, May 1975–May 1976, July-
1978). Some plant foods lack the bout-length data, mainly because the employment of the
focal animal sampling method was biased to the season, August-December. Therefore, the
number of bouts is not always comparable with each other in terms of the food availability,
since the food item available in August-December period has been more often sampled than in
any other period of the year.

Botanical Latin names: All Latin and author names in this paper are used in accordance
with the rules explained in an earlier listing (Nishida & Uehara eds., 1981: 112–113). In
addition, only the name shown by botanists to fertile samples is preferentially chosen in this
listing in case that different names have been given to a single species. However, there are
several cases in which two names are simply listed. This is either because fertile samples of the
same species have been identified as two different species or because fertile specimens of the
species have not been collected yet. The only exception to the rules above is Salacia sp. (Cel-
astraceae) whose fertile samples have been given three trivial names on different occasions.
Only generic and specific names are mentioned here.

Plant parts eaten by chimpanzees: Plant parts eaten are divided into the following categories.
LS: leaves, buds, and/or young shoot (or stem). BI: blossom. F: fruits, including pods and
grass seeds. Se: seed. Applied only when seeds extracted from fruits are selectively eaten with
other parts rejected. B: bark or cambium. W: wood. Applied to live or dry dead wood and
only when it is chewed. Sp: sap. Any licked substance including liquid from live or dead trunk
or branch of tree. P: pith. Applied only when live inner unliignified tissue extracted from shoot
or stem is selectively consumed with leaves ignored. R: resin. Applied to solid or soft semisolid
substance secreted from live trunk or branch of tree and only when it is chewed.

Only particular portions of the nine categories are harvested by the chimpanzees in some
cases (e.g., pith of petiole etc.). These are described in the section of 'Notes on Techniques for
Feeding on Plant Foods'.

Life form: The life form of the plant is divided into five categories. T: tree. S: shrub. H:
herb. L: liana, or other climber. P: parasite.

Habitat: Habitat of the food plants is divided into three categories. F: any type of forests
including moist, evergreen or semi-deciduous gallery forest and dryer types of semi-deciduous
forest occurring on the ridge of a hill. S: any type of openland vegetation including Acacia
savanna, Brachystegia woodland and a variety of mixed woodland types except “L” that fol-
 lows. L: lakeside sand beach and open riverside vegetation including aquatic plants. F–S indi-
cates that the species, though extending over the openland to a certain degree, distributes
mainly in the forest, while S–F indicates that the species distributes more abundantly in the
openland than in the forest.

PLANT FOODS

The plant species consumed by the chimpanzees are listed in Table 1.

NOTES ON TECHNIQUES FOR FEEDING ON PLANT FOODS

Leaves: Chimpanzees hold the leafy branch with one hand and strip tiny leaves off with the
mouth in a stroke of head movement, or pull them through with fingers and put them into the
mouth. They may pick off a large leaf or leaves with one hand, putting them into the mouth.
Table 1. List of plant foods. This table lists (1) botanical name, followed in this order by (2) life form, (3) habitat, (4) part eaten, (5) food season, (6) maximal length of feeding bout in min, and (7) number (N) of bouts in which the bout-lengths were recorded. The order of families follows that of J. Hutchinson (1926 and 1934) Families of Flowering Plants first edition. Symbols: *; food items recorded only once, ~; cultigens, [B] [M] [L]; recorded only in chimpanzees of B (M, or L) group. All other foods were recorded at least once in K-group chimpanzees.

<table>
<thead>
<tr>
<th>Family</th>
<th>Genus</th>
<th>Species</th>
<th>Habitat</th>
<th>Part Eaten</th>
<th>Food Season</th>
<th>Maximal Length of Feeding Bout</th>
<th>Number of Bouts</th>
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<tr>
<td>PTERIDOPHYTA</td>
<td>Pteridium aquilinum (L.) Kuhn</td>
<td></td>
<td></td>
<td></td>
<td>Jan, Mar, Jul-Aug, Oct, Dec</td>
<td>2 N = 18</td>
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<td></td>
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<td></td>
<td>P: May, Aug</td>
<td>4 N = 1</td>
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<tr>
<td>ANGIOSPERMAE: DICOTYLOIDS</td>
<td>Annona senegalensis Pers.</td>
<td></td>
<td></td>
<td></td>
<td>Oct-Feb</td>
<td>2 N = 1</td>
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<td></td>
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<td>LS: Oct-Mar</td>
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<td>Bk: Jul, Sept</td>
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<td></td>
<td>Artabotrys monteiroae Oliv.</td>
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<td>LS: Jul</td>
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<tr>
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<td>Uvaria angolensis Oliv.</td>
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<td>LS: Feb-May</td>
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<td>Illigera pentaphylla Welw.</td>
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<td>Pyrenanthus angolensis (Welw.) Warb.</td>
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<td>Ranunculaceae</td>
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<tr>
<td></td>
<td>Clematopsis scabiosifolia (DC.) Hutch.</td>
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<td>Dioscoreophyllum volkensit Engl.</td>
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<tr>
<td></td>
<td>(Dillon &amp; A. Rich.) Walp.</td>
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<td>Tinospora caffra (Miers) Troupin</td>
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<td>Pilostyles aethiopica Welw.</td>
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<td>Adenia runicifolia Engl. &amp; Harms</td>
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<td>Coccinia barteri (Hook. f.) Keay or C. adoensis (A. Rich.) Cogn.</td>
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<td>Mukia maderaspatana (L.) R. J. Roem.</td>
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<tr>
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<td>Syzygium guineense (Willd.) DC. [L]</td>
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<td>Garcinia huillensis Oliv.</td>
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<tr>
<td><em>Harungana madagascariensis</em> Poir.</td>
<td>Tiliaceae</td>
<td>T S-F Dec</td>
<td>Apr-Sept</td>
<td>11</td>
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<tr>
<td><em>Grewia mollis</em> Juss.</td>
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<td>T S Apr-Jun</td>
<td>Mar-Jun</td>
<td>13</td>
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<td>Apr-Jul</td>
<td>8</td>
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<tr>
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<td>LS: All year</td>
<td>62</td>
<td>N = 152</td>
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<td></td>
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<td>Bk: Jan, Mar</td>
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<td></td>
<td>LS: All year</td>
<td>62</td>
<td>N = 152</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Bk: Mar-Aug, Nov-Sept</td>
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<td>N = 1</td>
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<td></td>
<td></td>
<td>1</td>
<td>N = 1</td>
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</table>

**Euphorbiaceae**

| Genera                        | Family                | Sp.:                      | F.:                        | N  | |
|------------------------------|-----------------------|---------------------------|----------------------------|----|
| *Acalypha chirinda* S. Moore | Euphorbiaceae         | S S LS: Jan-Mar            | F: Mar-Nov                  | 8  | N = 4 |
|                             |                       |                           |                             | 51 | N = 35 |
|                             |                       |                           |                             |    |      |
| *Croton syl·vaticus* Hochst. ex Krause | Euphorbiaceae | T F F: Apr                  | F: Apr                       | 36 | N = 10 |
|                             |                       |                           |                             |    |      |

**Malvaceae**

| Genera                        | Family                | Sp.:                      | F.:                        | N  | |
|------------------------------|-----------------------|---------------------------|----------------------------|----|
| *Azanza garckeana* (F. Hoffm.) Exell & Hillcoat | Malvaceae | T S Bl: Jan-Mar            | F: Mar-Nov                  | 8  | N = 4 |
|                             |                       |                           |                             | 51 | N = 35 |

**Caesalpiniaceae**

| Genera                        | Family                | Sp.:                      | F.:                        | N  | |
|------------------------------|-----------------------|---------------------------|----------------------------|----|
| *Afxella africana* Pers.      | Caesalpiniaceae       | T S *Se: Mar               | F: Jun                       | 6  | N = 1 |
|                             |                       |                           |                             | 76 | N = 13 |
|                             |                       |                           |                             | 63 | N = 36 |
|                             |                       |                           |                             | 2  | N = 3 |
### Natural Diet of Chimpanzees

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Sp.</th>
<th>LS.</th>
<th>F:</th>
<th>Bk:</th>
<th>W:</th>
<th>Se:</th>
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<tbody>
<tr>
<td><em>Brachystegia spiciformis</em> Benth.</td>
<td>T</td>
<td>S</td>
<td>Feb</td>
<td></td>
<td>14</td>
<td>N = 3</td>
</tr>
<tr>
<td><em>Julbernardia seretti</em> (De Wild.) Troupin</td>
<td>T</td>
<td>F</td>
<td>Nov</td>
<td></td>
<td>1</td>
<td>N = 1</td>
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<tr>
<td><em>(Schumach.) Milne-Redh.</em></td>
<td>T</td>
<td>S</td>
<td>Apr</td>
<td></td>
<td>29</td>
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<tr>
<td><strong>Mimosaceae</strong></td>
<td></td>
<td></td>
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<tr>
<td><em>Acacia hockii</em> De Wild.</td>
<td>S-T</td>
<td>S</td>
<td>Aug</td>
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<td>60</td>
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<td>T</td>
<td>S</td>
<td>Jul</td>
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<td>25</td>
<td>N = 7</td>
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<tr>
<td><em>(Schum. &amp; Thonn.) Benth.</em></td>
<td>T</td>
<td>F</td>
<td>Jan</td>
<td></td>
<td>N = 1</td>
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<tr>
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<tr>
<td><em>Baphia capparidifolia</em> Bak.</td>
<td>L</td>
<td>F</td>
<td>Jul</td>
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<td>38</td>
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<td><em>Mucuna gigantea</em> (Willd.) DC.</td>
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<td>Jun</td>
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<td>23</td>
<td>N = 19</td>
</tr>
<tr>
<td><em>Neorautanenia nitis</em> (A. Rich.) Verdec.</td>
<td>L</td>
<td>S</td>
<td>Jan</td>
<td></td>
<td>1</td>
<td>N = 1</td>
</tr>
<tr>
<td><em>Pseudarthria hookeri</em> Wight &amp; Arn.</td>
<td>S</td>
<td>L</td>
<td>Jan</td>
<td></td>
<td>1</td>
<td>N = 1</td>
</tr>
<tr>
<td><em>Paophocarpus scandens</em> (Endbl.) Verdec.</td>
<td>L</td>
<td>S-L</td>
<td>Jan</td>
<td></td>
<td>1</td>
<td>N = 1</td>
</tr>
<tr>
<td><em>Hallbergia boehmii</em> Taub.</td>
<td>T</td>
<td>S</td>
<td>Aug</td>
<td></td>
<td>36</td>
<td>N = 41</td>
</tr>
<tr>
<td><em>R.:</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Rk:</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Moraceae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Chlorophora excelsa</em> (Welw.) Benth. &amp; Hook. f.</td>
<td>T</td>
<td>F</td>
<td>Aug</td>
<td></td>
<td>42</td>
<td>N = 4</td>
</tr>
<tr>
<td>LS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>27</td>
<td>N = 3</td>
</tr>
<tr>
<td><em>Ficus capensis</em> Thunb.</td>
<td>T</td>
<td>F</td>
<td>All year</td>
<td>Aug-Sep</td>
<td>70</td>
<td>N = 283</td>
</tr>
<tr>
<td>LS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ficus congensis</em> Engl.</td>
<td>T</td>
<td>F</td>
<td>Mar</td>
<td></td>
<td>29</td>
<td>N = 11</td>
</tr>
</tbody>
</table>

---

*Note: LS = Last Season, F = Flowers, Bk = Berries, W = Winter, Se = Summer.*
| Ficus exasperata Vahl | T F F: Mar | 61 N = 20 |
| Ficus glumosa Del. | LS: All year | 66 N = 99 |
| Ficus ingens (Miq.) Miq. | T F F: Sept | 32 N = 5 |
| Ficus sonderi Miq. | T S F: Jul–Aug, Oct | 43 N = 9 |
| Ficus thonningii Blume | T L F: Apr, Jul–Sept | 32 N = 15 |
| Ficus urceolaris Welw. ex Hiern | S F F: All year | 17 N = 78 |
| Ficus vallis-choudae Del. | LS: Dec–Jan, Jul | 6 N = 5 |
| Ficus sp. | T S–F F: Jul, Sept | 15 N = 6 |
| Myrianthus hostU Eng!. | LS: Jan N = 1 |
| Salacia sp. | L F F: Oct | *LS: Jan 1 N = 1 |
| Ximenia americana L. | S-T S F: Oct–Nov | 1 N = 1 |
| Ziziphus mucronata Willd. | T S F: Jul–Aug | 56 N = 15 |
| Vitaceae | L S *F: Apr | 9 N = 2 |
| Ampelocissus africana (Lour.) Merr. | LS: Dec–Feb | 1 N = 3 |
| Ampelocissus cavicaulis (Bak.) Planch. | P: Jan–Feb, Aug–Oct | 4 N = 6 |
| Cissus oliveri (Engl.) Gilg | L S L*LS: Jan | 1 N = 1 |
| Cissus ?petiolata Hook. f. | W: Dec | 2 N = 2 |
| Cissus rubiginosa (Welw. ex Bak.) Planch | L S F: Feb–Apr | 1 N = 1 |
| Cyphostemma sp. [B] | H S F: Nov | 1 N = 1 |
| Leea guineensis G. Don | S F F: Jun–Sept | 1 N = 1 |
| Rhoeicissus sp. | L F LS: Jul | 6 N = 1 |
| Rutaceae | | |
| *Citrus limon (L.) Burm. f. | T — F: Sept–Nov | (McGrew, pers. comm.) |
| Teclea nobilis Del. [B] | T F F: | |
| Toddalia asiatica (L.) Lam. | L F F: May–Oct | 1 N = 2 |
| Burseraceae | | |
| Canarium schweinfurthii Engl. | T F *F: Dec | 53 N = 49 |
| Meliaceae | | |
| Trichilia prieuriana A. Juss. | T F LS: Mar–Jul | 8 N = 1 |
| Sapindaceae | | |
| Alliphyllus congolanus Gilg | S-T F–S LS: Feb–Mar | 1 N = 2 |
| Deinbollia fulvo-tomentella Bak. f. | S-T F F: Jan | |
| Haplocoelum foliolosum (Hiern) Bullock | T S LS: | |
| Lecaniodiscus fraxinifolius Bak. | T F–S F: Nov–Dec | |
| Paulinia pinnata L. | L F–S F: Sept–Oct | |
Natural Diet of Chimpanzees

Zanha golungensis Hiern

- **LF**: Jan-Aug
- **F**: Nov
- **LS**: Sept
- **N**: 34
- **R**: Mar [M] (Hiraiwa, pers. comm.)

Anacardiaceae


- **TS**: Sept-Nov
- **F**: Oct-Jan
- **LS**: Jan-Feb
- **N**: 1
- **R**: Mar [M] (Hiraiwa, pers. comm.)


- **F**: Jun-Nov
- **LS**: Nov-Apr, Aug
- **N**: 84

% *Mangifera indica* L.

- **F**: Oct
- **N**: 194
- **R**: Mar [M] (Takasaki, in press)

Ebenaceae

* Diospyros kirkii* Hiern [B]

- **TS**: Oct-Nov
- **F**: Jul

Sapotaceae

*Afrosperalis cerasifera* (Welw.) Aubrev.

- **BS**: Feb-Jul

*Bequaertiodendron magialismonatum* (Sond.) Hiene & J. H. Hemsl.

- **TF**: Nov

*Mimusops penduliflora* Engl.

- **TS**: June-Jul
- **F**: Jul
- **LS**: Jan
- **N**: 26

Loganiaceae

*Antheolestia schweinfurthii* Gilg

- **T**: Mar-Apr, Sept-Dec
- **F**: Nov
- **LS**: Jan
- **N**: 14

*Strychnos innocua* Del.

- **T**: Sept-Mar
- **F**: Nov
- **LS**: Jan
- **N**: 14

Oleaceae

*Jasminum* sp.

- **S-L ?**: LS: Nov-Dec

Apocynaceae

*Anchylolobothrys amoena* Hua

- **LF**: Jan
- **F**: Jan
- **N**: 7

*Diplorhynchus condylocarpou* (Muell. Arg.) Pichon

- **TS**: Oct-Nov
- **F**: Jan-Sept
- **LS**: Sept-Feb
- **N**: 180
- **P**: Oct
- **Sp**: May
- **L**: Jan (coprophagy)
- **Sp**: Apr
- **LS**: Dec-Jan, May-Jun, Aug, Oct
- **N**: 3
- **P**: Feb-Aug, Oct
- **N**: 23

*Oncinotis inandensis* Wood. & Evan

- **LF**: Jul-Mar
- **F**: Dec-Jan
- **LS**: May-Jun, Aug
- **N**: 350

*Saba florida* (Benth.) Bullock

- **LF**: Jul-Mar
- **F**: Dec-Jan
- **LS**: May-Jun, Aug
- **N**: 350

*Landolphia owariensis* P. Beauv.

- **LS**: Nov-Jan, Jun
- **N**: 2

*Rubiaceae*

*Canthium (rassum* Hiern

- **LF**: Dec-Jan
- **F**: Nov
- **LS**: Sept-Jul
- **N**: 2

*Canthium venosum* (Oliv.) Hiern

- **LF**: Dec-Jan
- **F**: Nov
- **LS**: Sept-Jul
- **N**: 3

*Canthium rubrocostatum* Robyns or

*C. vulgare* (K. Schum.) Bullock

- **TS**: Apr-Aug
- **N**: 42

*Ricinodendron raufoss* N. E. Br.

- **LF**: Dcc-Jan, Jul

*Asclepiadaceae*

*Ceropegia* sp. or *Cynanchum* sp.

- **LF**: Dec-Jan
- **F**: Jan
- **LS**: Sept-Jul
- **N**: 3

*Ceropegia* sp.

- **LF**: Dec-Jan
- **F**: Nov
- **LS**: Sept-Jul
- **N**: 6

*Dracaena schimperi* (Decne.) Bullock

- **LS**: Nov
- **N**: 1

*Viocanga lutescens* Stapf

- **LF**: May-Oct
- **F**: May-Oct
- **LS**: Nov-Dec
- **N**: 11

*Tabernaemontana holstii* K. Schum.

- **LF**: Jul-Sep
- **F**: May-Oct
- **LS**: Nov-Dec
- **N**: 1

*Voacanga lucasens* Stapf

- **LF**: Dec-Jan
- **F**: Nov
- **LS**: Sept-Jul
- **N**: 3

*Canthium crassum* Hiern

- **LF**: Dec-Jan
- **F**: Nov
- **LS**: Sept-Jul
- **N**: 2

*Canthium venosum* (Oliv.) Hiern

- **LF**: Dec-Jan
- **F**: Nov
- **LS**: Sept-Jul
- **N**: 2

*Canthium rubrocostatum* Robyns or

*C. vulgare* (K. Schum.) Bullock

- **TS**: Apr-Aug
- **N**: 49

*Chassalia cristata* (Hiern) Brenek

- **LF**: Nov
- **LS**: June-Jul
- **N**: 1

*Mussaenda arcuata* Lam. ex Poir.

- **S-L-T**: F-S
- **F**: Oct
**LS:** Pavetta sp.
**P:** Mar
**F:** Jun-Jul, Oct
**LS:** Psychotria peduncularis (Salisb.) Steyerm.
**S:** Mar-Jul
**F:** Jan, Mar
**LS:** Rothmania manganjae (Hiern) Keay
**T:** F
**LS:** Rytigyllia sp.
**S:** Jan

**Compositae**

**Aspilia mossambicensis** (Oliv.) Wild
**H:** All year
**S:** N = 14

**Bidens grantii** (Oliv.) Scherff.
**H:** May
**S:** N = 2

**Crascocephalum bajeri** (DC.) Robyns or **Gymira scandens** O. Hoffm.
**L:** Jan-May

**Crascocephalum crepidioides** (Benth.) S. Moore
**H:** Mar
**S:** N = 1

**Crascocephalum vitellinum** (Benth.) S. Moore
**H:** Feb
**S:** N = 1

**Sonchus schweinfurthii** Oliv. & Hiern
**T:** Nov-Apr, Jul-Sept
**P:** Nov-May, Aug-Sept
**Bk:** Jul-Aug
**S:** N = 18

**Vernonia amygdalina** Del.
**T:** Jul-Aug
**P:** Jan, Mar, Oct
**S:** N = 3

**Boraginaceae**

**Cordia africana** Lam.
**T:** Jun-Sept
**S:** N = 4

**Cordia millenii** Bak.
**T:** Sept
**S:** N = 8

**Convolvulaceae**

**Hewittia sublobata** (L. f.) O. Ktze.
**L:** Jan-Feb, Jun-Jul, Sept
**S:** N = 5

**Ipomoea cairica** (L.) Sweet
**L:** Jan, Apr-May, Jul-Sept
**S:** N = 5

**Ipomoea muricata** (L.) Jacq.
**L:** Jun

**Ipomoea ochracea** (Lindl.) G. Don
**L:** Jun

**Ipomoea rubens** Choisy
**L:** Jun

**Ipomoea sp.**
**L:** Jan, Aug, Nov
**S:** N = 9

**Lepistemolowariense** (Beauv.) Hall. f.
**L:** Feb

**Merremia pterygotaulus** (Steud. ex Choisy) Hall. f.
**L:** Jun

**Bignoniaceae**

**Markhamia hildebrandti** (Bak.) Sprague
**T:** Nov-Feb, Aug
**Bk:** Dec

**Spathodea nilotica** Seem.
**T:** Aug

**Stereospermum kunthianum** Cham.
**T:** Jan, Nov

**Acanthaceae**

**Asystasia gangetica** (L.) T. Anders.
**H:** Apr
**S:** N = 1

**Blepharis buchneri** Lindau
**H:** Jan-Apr, Aug-Nov
**S:** N = 4

**Dyschoriste trichocalyx** (Oliv.) Lindau
**T:** Aug-Dec

**Thunbergia alata** Boj. ex Sims
**L:** Jan-May
**S:** N = 8

**Whitfieldia sp.** [B]
**L:** Oct

**Verbenaceae**

**Clerodendrum schweinfurthii** Guerke
**S:** (galled flower): Apr
**L:** Aug-Nov
**S:** N = 1

**Lippia plicata** Baker
**H:** Mar
**S:** N = 1
Natural Diet of Chimpanzees

| Preanna sp. | T | S | LS: Mar, Apr | 1  N = 1 |
| Vitex doniana Sweet | T  | S | F: Jun |

**ANGIOSPERMAE: MONOCOTYLEDONS**

**Musaceae**

*Ensete edule* (Gmel) Horan

- H | F | P: Oct
- F: All year
- LS: Mar, Aug, Sept
- P: All year

**Zingiberaceae**

*Aframomum alboviolaceum* (Ridley) K. Schum.

- H | S | P: Sept-Jun
- H | F | F: All year
- P: All year

*Aframomum mala* (K. Schum.) K. Schum.

- H | S | F: Mar–Aug
- P:

*Costus after* Ker-Gawl

- H | F | F: Jul [B]
- P: Feb–Dec

**Renealmia engleri** K. Schum.

- H | F | P: Mar–Aug

**Marantaceae**

*Marantochloa leucantha* (K. Schum.) Milne-Redh.

- H | F | *F: Jul
- *P: Jun–Dec

**Smilacaceae**

*Smilax kraussiana* Meisn.

- L | F–S LS: Sept–May

**Araceae**

*Culcasia scandens* P. Beauv.

- L | F | *LS: May

**Dioscoreaceae**

*Dioscorea odoratissima* Pax

- L | S–F | F: Mar–Apr
- LS: Mar

*Dioscorea schimperana* Kunth

- L | S | F: Mar–Apr
- LS: Oct–Mar
- P: Oct

**Agavaceae**

*Dracaena reflexa* Lam.

- T | F | LS: Jan, Jul

**Taccaceae**

*Tacca leontopetaloides* (L.) O. Ktze.

- H | S | F: Mar

**Cyperaceae**

*Cyperus papyrus* L.

- H | L | P: Mar

*Cyperus sp.* [M]

- H | L | P:

**Gramineae**

*Brachiaria brizantha* (A. Rich.) Stapf

- H | S | F: Apr

*Hyparrhenia variabilis*

- H | S | *P: Jan

*Olyra latifolia* L.

- H | F | F: Apr–May, Jul–Aug
- P: May, Oct

**Oxytenanthera abyssinica**

(A. Rich.) Munro [B]

- H | S | P: Oct–Nov

*Panicum maximum* Jacq.

- H | S | F: Apr–May, Aug

*Pennisetum purpureum* Schum. ch

- H | S–L | P: All year

*Phragmites mauritianus* Kunth

- H | L | P: Jul–Mar, May

*Saccharum officinarum* L.

- H | P: All year

*Vossia cuspidata* (Roxb.) Griff.

- H | L | P: All year

*Zea mays* L.

- H | P: Dec–Feb

N. B.: The following four species (life form and parts eaten in parentheses) have been recorded only by the Tanzanian assistants as additional food plants of the chimpanzee. They are, as a temporary measure, not included in the further analysis in the section of 'Diversity of Plant Foods'.

**Annonaceae**: *Uvaria* sp. (?L; F)

**Papilionaceae**: *Sphenostylis stenocarpa* (A. Rich.) Harms (L; Bl, F, LS)

**Loganiaceae**: *Strychnos cocculoides* Bak. (T; Bl, F)

**Gramineae**: *Sorghum bicolor* (L.) Moench (H; P)
Sometimes, they make a pile of leaves in a hand and then put them altogether into the mouth. On other occasions, they make a pile of leaves in the mouth and then chew all of them together. Young leaves or buds are preferred and are frequently consumed along with the shoot or stem to which they are attached. Leaves are eaten mostly in the tree; however, they often obtain leaves of particular species on the ground (small trees of *Pterocarpus tinctorius* and *Sterculia tragacantha*, shrubs of *Ficus urceolaris*, etc.). Leaf-blades of some plants are mostly ignored with only the petiole (or the pith of the petiole) consumed: Such plants are *Cordia millenii*, *Ficus congensis*, *Ipomoea rubens* and *Myrianthus holstii*.

**Blossoms:** Blossoms are usually eaten in similar ways as the leaves. For some species (e.g., *Erythrina abyssininica*, *Sterculia tragacantha*, etc.), chimpanzees break off and hold the flowering branch with one hand and put each blossom into the mouth. Favorite flowers such as *E. abyssininica* are also occasionally recovered from the ground, when conspecifics in the tree let them fall.

**Fruits and seeds:** Fruits and seeds are mainly taken in the tree. Particularly, the seeds of *Parkia fillicoides* are available usually 20 m or higher above the ground. However, chimpanzees prefer to obtain fallen fruits, rather than intact ones, of some species on the ground; these are mostly dry types of fruits with stickly pulp available in the dry season (e.g., fruits of *Canthium crassum*, *Parinari curatellifolia*, *Uapaca kirkiana*, seeds of *Piliostigma thomningii*, etc.). To humans, only fallen, ripe fruits of the former three species seem tannin-free and edible. On the other hand, fallen dry seeds of *Brachystegia bussei* are usually neglected.

Very many species of fruits which are usually harvested in the tree are also recovered on the ground. When chimpanzees in large numbers climb a huge fruiting tree (e.g., *Pseudospondias microcarpa*), some adults (especially older ones) remain on the ground, picking up and feeding from the fruit-laden branches which are inadvertently discarded by conspecifics climbing on the tree. More commonly, when chimpanzees revisit the same fruiting tree after a few days of the former exploitation, they eagerly search for and pick up the fallen fruits, occasionally under the fallen leaves and even from the surface water, which have become ripe on the ground.

A few species of intact fruits are regularly harvested on the ground from short trees or shrubs (*Ficus urceolaris*, *Psychotria peduncularis*, etc.). The feeding method on fruits of particular genera are recognized to change seasonally: Chimpanzees usually feed on seeds, pulp and fruit-skin from immature fruits, and only seeds from mature fruits of *Pterocarpus tinctorius*, *Sterculia tragacantha*, *S. quinquefolia*, etc. Hard-shelled fruits of Apocynaceae (e.g., *Saba florida*) or Loganiaceae (e.g., *Styrchnos innocua*) are bit open with incisors.

**Pith:** Herbs of Gramineae and Zingiberaceae are eaten quite regularly throughout the year. Usually pith of lower parts of immature grass and mature zinger stems is eaten, but occasionally pith of the upper part of mature grass (e.g., *Pennisetum purpureum*) is eaten. Pith of a woody vine species (*Landolphia owariensis*) is particularly common diet in the chimpanzees of Mahale. Green-yellow inner pith of 1 mm in diameter is quite skillfully extracted with teeth and fingers and consumed. In one species, only the pith of branch is eaten (*Cordia millenii*). Bamboo shoots of Gramineae (*Phragmites*, *Olyra*, and *Oxytenanthera*) are rarely eaten.

**Bark:** Although outer and inner bark of some species (e.g., *Pycnanthus angolensis*, *Sesbania sesban*, *Vernonia amygdalina*, etc.) is consumed, chimpanzees feed only upon inner bark or cambium of particular plant species (*Brachystegia bussei*, *S. tragacantha*, *S. quinquefolia*, etc.), usually in the later part of the rainy season, when fruits are usually less available than in any other part of a year (Nishida, 1976). Cambium of *B. bussei* was especially important at least for one week in March 1976, and quite lengthy feeding bouts were recorded.

**Wood:** Though rarely, chimpanzees earnestly feed on (sometimes, lick on) live or dry wood of particular trees such as *Ficus capensis*, *Pycnanthus angolensis*, etc. Some of the dry trees are
regularly visited by chimpanzees, and huge "caves" are thus formed. Since a chimpanzee creeps into the "cave" with the head first, only its buttocks are seen at the outside of the trunk of the tree when feeding on the wood.

Resin: Resin is available only in small quantities. Usually a chimpanzee stands bipedally on the ground and picks off a small piece of resin from *B. busset, Combretum molle* or *Monotes elegans* trees. Only twice, more than three chimpanzees were observed to feed on resin simultaneously, which occurred high up in a giant tree (*Albizia glaberrima*).
Root: Though not identified botanically, a few species of woody roots which emerge on the ground are cut off with incisors and chewed. No root-digging behavior has been observed.

Several plants are illustrated in Figs. 1–3, and feeding behaviors on various parts of plants are illustrated in photos (Figs. 4–9).
Fig. 6. An adolescent female feeding on the resin from *Albizia glaberrima* (Schum. & Thonn.) Benth. (Mimosaceae).
Fig. 7. Tooth-marked inner bark of Brachystegia bussei Harms (Caesalpiniaeeae).

Fig. 8. An adolescent male feeding on the pith of Pennisetum purpureum Schumach. (Gramineae).

Fig. 9. An old male feeding on dry dead wood of Pycnanthus angolensis (Welw.) Warb. (Myristicaceae).
DIVERSITY OF PLANT FOODS

The 328 recorded plant foods (including eight foods from cultigens) are from 198 species (including six species of cultigens) of plants. As only K-group chimpanzees are concerned, they consume 315 food items (or 307 excluding food items from cultigens) from 190 plant species (or 184 excluding cultigens) (Table 2). This result contrasts with 184 plant foods from 141 plant species reported for Gombe chimpanzees (Wrangham, 1975), the only other data available from a similarly long-term study. This difference may probably be caused by richer flora and more time spent in collecting food data at Mahale.

However, 46 (14.0%) of 328 food items were recorded only once throughout the study period. Moreover, over 40 items were recorded on less than 10 times. Wrangham (1975) stated that 27 (17%) of the 163 confirmed records were seen eaten only once. Probably, individuals were experimenting by eating items not previously used as foods, as Wrangham (1975) suggested. Long-term fecal analysis (Nishida et al., unpublished data) has elucidated drastic inter-annual changes in food composition and relative importance of specific plant food item in the diet of wild chimpanzees. Probably, some food items important in the diet in one year may be unimportant in another, even when it is available. Kortlandt and van Zon (1969) stated that before large-scale persecution by man started no less than about one half of the geographical range of the chimpanzee consisted of savannas, open woodlands and dry forests, and the other half of rain forests. Wrangham (1975) states that the ability to use such a large range of food items is important in permitting adaptation to a wide geographical range. The discrepancy in the number of food items between Gombe and Mahale might prove the ability of chimpanzees to exploit and incorporate new food items into their diet from the environment that they might newly colonize. Plant food repertoire of chimpanzees in other parts of Africa are given by Nissen (1931), Azuma & Toyoshima (1962), Reynolds & Reynolds (1965), Izawa & Itani (1966), de Bouronville (1967), Suzuki (1969) and Hladik (1973).

The 192 wild species are composed of one parasite (0.5%), 29 herbs (15.1%), 18 shrubs (9.4%), 83 trees (43.2%), 52 lianas (27.1%), 1 herb-shrub (0.5%), 3 shrub-lianas (1.6%), 4 shrub-trees (2.1%), and one shrub-liana-tree (0.5%); or they consist of 80 forest species (41.7%), 73 openland species (38.0%), 10 lakeshore species (5.2%), 11 forest-openland spe-

Table 2. Number of food types classified by parts eaten.

<table>
<thead>
<tr>
<th>Part</th>
<th>Total No. of Species</th>
<th>No. of Food Types Recorded Only Once</th>
<th>Cultigens</th>
<th>Food Types Recorded Only in B-group</th>
<th>Food Types Recorded Only in L-group</th>
<th>Food Types Recorded Only in M-group</th>
<th>Natural Food Types Recorded in K-group*</th>
<th>Natural Food Types Regularly Eaten in K-group*</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS</td>
<td>117</td>
<td>16**</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>114</td>
<td>99</td>
</tr>
<tr>
<td>F</td>
<td>100</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>92</td>
<td>84</td>
</tr>
<tr>
<td>Bl</td>
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<td>7</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>28</td>
<td>21</td>
</tr>
<tr>
<td>P</td>
<td>36</td>
<td>3***</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>Bk</td>
<td>14</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Se</td>
<td>15</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>W</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Sp</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>R</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>46</td>
<td>8</td>
<td>9</td>
<td>1</td>
<td>3</td>
<td>307</td>
<td>263</td>
</tr>
</tbody>
</table>

*excluding cultigens  
**including one recorded only in B-group  
***including one recorded only in M-group
Table 3. List of animal foods. Number of direct observational episodes of vertebrate predation (capture, carcass transport, and consumption) from the onset of the field study in this area (October 1965) to May 1982 is given below for each vertebrate species. On the other hand, data of the maximum length of the feeding bout in min are given for entomophagy.

Vertebrates: Stages eaten are described last. $\$ $ indicates domestic species.

<table>
<thead>
<tr>
<th>Class</th>
<th>Species</th>
<th>N</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammalia</td>
<td>Galago crassicaudatus crassicaudatus</td>
<td>1</td>
<td>Adult</td>
</tr>
<tr>
<td></td>
<td>Colobus badius tephrosceles</td>
<td>10</td>
<td>Juveniles</td>
</tr>
<tr>
<td></td>
<td>Cercopithecus ascanius schmidtii</td>
<td>6</td>
<td>Juveniles</td>
</tr>
<tr>
<td></td>
<td>C. aethiops centralis</td>
<td>3</td>
<td>Juveniles</td>
</tr>
<tr>
<td></td>
<td>Pan troglodytes schweinfurthii</td>
<td>3</td>
<td>Infants</td>
</tr>
<tr>
<td>Rodentia</td>
<td>Cricetomys emini</td>
<td>1</td>
<td>Juvenile</td>
</tr>
<tr>
<td></td>
<td>squirrel</td>
<td>1</td>
<td>Adult</td>
</tr>
<tr>
<td>Artiodactyla</td>
<td>Cephalophus monticola</td>
<td>20</td>
<td>Juveniles, Adults</td>
</tr>
<tr>
<td></td>
<td>Tragelaphus scriptus</td>
<td>13</td>
<td>Juveniles</td>
</tr>
<tr>
<td></td>
<td>Potamochoerus porcus</td>
<td>7</td>
<td>Infants, Juveniles</td>
</tr>
<tr>
<td>Hyracoidea</td>
<td>Heterohyrax brucei</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unidentified</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Aves</td>
<td>Francolinus squamatus</td>
<td>2</td>
<td>Young birds</td>
</tr>
<tr>
<td></td>
<td>Guttera eduardi</td>
<td>1</td>
<td>Egg</td>
</tr>
<tr>
<td></td>
<td>Melanopteryx nigerrinus</td>
<td>3</td>
<td>Fledgelings, Eggs</td>
</tr>
<tr>
<td></td>
<td>Centropus superciliosus</td>
<td>1</td>
<td>Adult</td>
</tr>
<tr>
<td>$$ Gallus gallus</td>
<td></td>
<td>11</td>
<td>Chickens</td>
</tr>
</tbody>
</table>

ANIMAL FOODS

Animal diet of wild chimpanzees consists of vertebrates and insects. Since the list of animal foods eaten by the chimpanzees of the Mahale Mountains and their feeding techniques have already been reported elsewhere (vertebrates—Nishida et al., 1979; Nishida, 1981; Kawana 1981, 1982; Hasegawa et al., in press; Norikoshi, 1982, in press: Takahata et al., in prep.; insects—Nishida, 1973; Nishida & Uehara, 1980; Uehara, 1982; Nishida & Hiraiwa, 1982), this paper reviews these studies, supplemented by a few unpublished data (Table 3).

Only evidence by direct observation is listed in Table 3. Comments on indirect evidence such as fecal remains will be given in “Notes on Vertebrate Prey”.

NOTES ON VERTEBRATE PREY

Among vertebrates, chimpanzees select only mammals and birds as their prey. They have never been seen to feed on reptiles, amphibians or fishes. Prey species consist mainly of primates and artiodactyles. Preying upon animals of the other orders is quite uncommon. This trend is similar throughout Africa (Goodall, 1963; Teleki, 1973, 1981; Suzuki, 1971; McGrew et al., 1979; Kawabe, 1966; Wrangham, 1975).

Among potential prey, blue monkeys (Cercopithecus mitis), yellow baboons (Papio cynocephalus cynocephalus), warthogs (Phacochoerus aethiopicus) and klipspringers (Oreotragus oreotragus) have not been observed to be preyed upon by the chimpanzees of Mahale. This
Table 3 (continued). Insects: Description of insect foods consists of (1) scientific name of the prey species, followed in this order by (2) stages or parts eaten, (3) recorded maximal length of feeding bout in min., (4) number of feeding bouts in which bout-lengths were recorded, and (5) feeding season (mentioned only for frequently observed prey).

<table>
<thead>
<tr>
<th>Insect Order</th>
<th>Species</th>
<th>Stages/Parts Eaten</th>
<th>Maximal Feeding Bout Length (min.)</th>
<th>Number of Bouts</th>
<th>Feeding Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hymenoptera</td>
<td>Crematogaster spp.</td>
<td>Eggs, Larvae, Pupae, Workers, Reproductives</td>
<td>43</td>
<td>N = 300</td>
<td>All year</td>
</tr>
<tr>
<td></td>
<td>(at least 5 species)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Camponotus vividus</td>
<td>Soldiers, Workers</td>
<td>136</td>
<td>N = 191</td>
<td>All year</td>
</tr>
<tr>
<td></td>
<td>C. maculatus</td>
<td>Soldiers, Workers</td>
<td>19</td>
<td>N = 22</td>
<td>All year</td>
</tr>
<tr>
<td></td>
<td>C. brutus</td>
<td>Soldiers, Workers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. sg. Myromotrema</td>
<td>Soldiers, Workers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oecophylla longinoda</td>
<td>Workers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tetramorium aculeatum</td>
<td>Workers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monomorium afrum</td>
<td>Eggs, Pupae, Larvae, Workers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apis mellifera</td>
<td>Honey, Workers (incidentally eaten)</td>
<td>1</td>
<td>N = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trigona spp.</td>
<td>Honey, Larvae</td>
<td>5</td>
<td>N = 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Xylocopa sp.</td>
<td>Honey, Larvae</td>
<td>13</td>
<td>N = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blatophaga spp.</td>
<td>Imagines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isoptera</td>
<td>Pseudacanthotermes spiniger</td>
<td>Soldiers</td>
<td>47</td>
<td>N = 12</td>
<td>Oct–Nov</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workers</td>
<td>2</td>
<td>N = 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reproductives</td>
<td>21</td>
<td>N = 49</td>
<td>Mar–May</td>
</tr>
<tr>
<td></td>
<td>P. militaris</td>
<td>Soldiers</td>
<td>2</td>
<td>N = 2</td>
<td>Oct–Feb</td>
</tr>
<tr>
<td>Hemiptera</td>
<td>Phytilina lata (in galled leaves of Chlorophola excelsa)</td>
<td>Larvae</td>
<td>153</td>
<td>N = 27</td>
<td>Aug–Sept</td>
</tr>
<tr>
<td>Coleoptera</td>
<td>Cerambycidae (unidentified)</td>
<td>Larvae, Imagines</td>
<td>2</td>
<td>N = 1</td>
<td></td>
</tr>
<tr>
<td>Orthoptera</td>
<td>Acridoidea (unidentified)</td>
<td>Imagines</td>
<td>1</td>
<td>N = 1</td>
<td></td>
</tr>
<tr>
<td>Lepidoptera</td>
<td>moth (unidentified)</td>
<td>Larvae, Imagines</td>
<td>1</td>
<td>N = 1</td>
<td></td>
</tr>
</tbody>
</table>

may be directly related with their availability. All of these species are either of low population density (C. mitis), or having very limited habitat overlap with the chimpanzees (Oreotragus), or both (yellow baboons and warthogs). Warthogs have only recently penetrated into the study area from outside, and the chimpanzees were observed to attempt to capture a warthog juvenile for the first time in 1981.

Chimpanzees do prey upon squirrels. Previous reports (Nishida et al., 1979; Kawanaka, 1982) designated the prey squirrel as *Protoxerus stangeri*. However, we have found that there coexist two different species of larger squirrels quite similar in size, form, color and habitat in our study area: *P. stangeri* and *Heliosciurus rufobrachiuln*. Probably, chimpanzees may eat both of them. However, we cannot specify which species chimpanzees actually preyed upon in previous observations.

Chimpanzees have been observed to attempt to capture a chequered elephant shrew (*Rhynchocyon cirnei*) twice (Kawanaka, 1982; Nishida, unpublished). Therefore, it is plausible that they occasionally prey upon them. A lump of mongoose fur was once detected in the feces of a chimpanzee and reported as *Ichneumia albicauda* (Nishida, et al., 1979). However, it has proved now that there are at least 3 species of mongoose in the study area (*Bdeogale crassicauda*, *Mungos mungo*, *I. albicauda*). Therefore, we cannot give specific name to the prey mongoose.
Chimpanzees of Mahale occasionally scavenge upon carcasses of bushbucks and blue duikers (Hasegawa et al., in press).

Mammal genera reported to be eaten at other areas of Africa, but not at Mahale include *Papio, Perodicticus* and *Manis* (McGrew, in press; Sugiyama, 1981). *Perodicticus* is unavailable at Mahale.

Chimpanzees prey upon eggs, fledgelings or chickens of birds. They have been observed to kill and eat an adult bird only once. That was an injured white-browed coucal (*Centropus superciliosus*) (R. Nyundo, pers. comm.). It is likely that chimpanzees usually do not prey upon healthy mature birds.

An adult male was once observed to try to take eggs or fledgelings from the nest of a crowned hawk eagle (*Stephanoaetus coronatus*) in the tree, but gave up his attempt, being discouraged by the parent’s attack (Takahata et al., in prep.).

Chimpanzees of Mahale only recently began to eat chickens of domestic fowls. Some chimpanzees of M-group and K-group began to prey upon chickens at our camps or workers’ camps (R. Nyundo, J. Katensi, & M. Hiraiwa, pers. comm.; Norikoshi, in press). Although chickens were available at Myako Camp all year round for more than two years from early 1976 to November 1978, chimpanzees of K-group preyed upon them only in a restricted period (July–August) when they also preyed upon the chicks of francolins in the natural habitat. Therefore, francolin feeding probably triggered the new habit of feeding on the chickens of domestic fowls. However, it is likely that this habit has not yet been popular to all individuals of two unit-groups. Wrangham (1975) listed 6 bird species as prey to the chimpanzees of Gombe; none of them have been recorded to be eaten at Mahale. (However, out of the 6 species in Wrangham’s listing 5 were recorded only once). At least 3 of the 6 species are present at Mahale.

NOTES ON INSECT PREY

Most of insects preyed upon by chimpanzees belong to the taxa, Hymenoptera,Isoptera and Hemiptera. Feeding method was described in detail in Nishida (1973), Uehara (1982), and Nishida & Hiraiwa (1982) (See Fig. 10).


There is yet no record of feeding upon *Tetramorium, Monomorium* and *Xylocopa* in other parts of Africa. *Dorylus* is eaten at Gombe and Mt. Assirik, while chimpanzees of Mahale neglect it. *Paracopium* (Hemiptera) was reported only from Gombe (Wrangham, 1975).

MINERAL AND MISCELLANEOUS FOODS

Mineral and miscellaneous foods are listed in Table 4. Chimpanzees feed or lick on inorganic matters such as rocks, sandy soil of a stream bed, and termite mud, and drink water (Fig. 11). They lick or feed on the rocks at the shore of Lake Tanganyika (Nishida, 1980),
Table 4. Mineral and miscellaneous foods. The maximal bout-length and number of bouts in which the bout-lengths were measured are given below for termite mud and rock feeding.

<table>
<thead>
<tr>
<th></th>
<th>Max.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Termite mud</td>
<td>8 min</td>
<td>61</td>
</tr>
<tr>
<td>Rock</td>
<td>71 min</td>
<td>60</td>
</tr>
</tbody>
</table>

Fig. 10. An adult male feeding on *Crematogaster* ants from *Vossia cuspidata* (Roxb.) Griff. (Gramineae).

Fig. 11. An adult male drinking water from a stream.
Fig. 12. An adult male (right) and an adolescent female licking the rock on the huge precipitous cliff.

or on the banks of rivers. A huge precipitous rock cliff was once visited and repeatedly licked by several chimpanzees of M-group (Fig. 12). Termite mud is eaten quite regularly all year round, though the bout-length seldom exceeds half a minute.

Chimpanzees ingest their own, or other conspecific's somatic secretions (snivel, semen, vaginal secretions, etc.) and blood. Wrangham (1975) lists up such miscellaneous items from his observation at Gombe. Bodily hair may be occasionally swallowed incidentally when grooming, since it is sometimes detected in their feces. Coprophagy is seldom observed.

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