

Chapter 17**CENTRAL AND EASTERN AFRICA: ZAMBIA****Taxonomic Inventory**

Taxa and life stages consumed

Coleoptera**Cerambycidae (long-horned beetles)**

Acanthophorus capensis (author?), larva
Acanthophorus confines Laporte, larva
Acanthophorus maculates (author?), larva

Scarabaeidae (scarab beetles)

Pachylomera femoralis (author?), larva

Family unknown

A few additional coleopterans

Homoptera**Cicadidae (cicadas)**

Ioba leopardina (author?), adult
Platypleura stridula (author?), adult
Ugada limbalis Karsch, adult

Hymenoptera**Apidae (honey bees, bumble bees)**

Apis mellifera adansonii Latr., larva
Apis mellifera capensis (author?), larva

Formicidae (ants)

Carebara vidua Sm., winged adult

Isoptera**Termitidae**

Macrotermes falciger Gerstaecker, winged adult
Macrotermes subhyalinus Rambur, winged adult
Macrotermes vatriolatus (Sjostedt) (= *vatriolatus*), winged adult
Odontotermes badius (Haviland), winged adult
Pseudacanthotermes spiniger Sjostedt, winged adult

Lepidoptera**Lasiocampidae (eggar moths, lappets)**

Catalebeda jamesoni B.-Bak, pupa
Pachypasa bilinear Walk., pupa

Limacodidae (slug caterpillars)

Limacodid sp., larva

Noctuidae (noctuids)

Busseola fusca Hmps., larva
Heliothis obsoleta Fabr., larva
Sphingomorpha chlorea Cr., larva
Spodoptera exempta Walker, larva
Spodoptera exigua Hubner, larva

Notodontidae (prominants)

Anaphe infracta Walk., larva, pupa (less often)
Desmeocraera sp., larva

Saturniidae (giant silk moths)

Bunaea alcinoe Stoll, larva, pupa
Bunaeopsis sp., larva, pupa
Cinabra hyperbius (Westwood), larva
Cirina forda (Westwood), larva, pupa
Gonimbrasia belina Westwood, larva, pupa
Gynanisa maia (Klug) (= *maja* Klug), larva, pupa
Holocerina agomensis Karsch, larva
Imbrasia epimethea Drury, larva, pupa
Lobobunaea christyi Sharpe, larva
Lobobunaea saturnus Westw., larva
Micragone ansorgei Rothschild, larva

Sphingidae (sphinx or hawk-moths)

Herse convolvuli (Linn.), larva
Nephele comma Hopffer, larva, pupa

Miscellaneous Lepidoptera

Several with uncertain scientific identity

Orthoptera**Acrididae (short-horned grasshoppers)**

Acanthacris ruficornis Fabr., adult
Acorypha nigrovariegata (author?), adult
Acrida sulphuripennis Gerstaecker, adult
Afroxyrrepes sp., adult
Amblyptymus sp., adult
Cardeniopsis guttatus (author?), adult
Catantops ornatus (author?), adult
Catantops sp., adult
Cyathosternum sp., adult
Cyrtacanthacris aeruginosa (author?), adult
Cyrtacanthacris septemfasciata Serville, adult
Cyrtacanthacris tartaria (author?), adult
Locusta migratoria (author?), adult
Locusta migratoria migratoroides Reiche and Fairmaire, adult
Locustana pardalina (Walker), adult
Oedaleus nigrofasciatus (author?), adult
Ornithacris spp. (2), adults
Poecilocerastis sp., adult
Schistocerca gregaria Forskal, adult

Gryllidae (crickets)

Acheta spp., adults
Brachytrupes membranaceus Drury, adult
Gryllus (= *Liogryllus*) *bimaculatus* De Geer, adult

Tettigoniidae (long-horned grasshoppers)

Ruspolia differens Audinet-Serville (= *Homorocoryphus nitidulus vicinus*), adult

Richards (1939: 37-42) discussed the composition and seasonal inadequacies of the Bemba diet in northeastern Zambia, which consists largely of finger millet. The bulk of each meal is a porridge made of this flour with subsidiary foods being eaten in small quantities. Richards states:

In effect the people have a harvest season from May to September in which millet, beer, green food, ground-nuts, pulses are plentiful, and meat in some areas, and the diet is therefore ample and probably varied. This is followed by a dry season (October-November) in which millet and beer are still available but green vegetables scarce or non-existent. The wild fruits are much liked,

but only last about a month or six weeks. Meat and fish are obtainable in these months also, but only in certain districts. At the beginning of the rains, November and December, the diet changes. Millet is already beginning to be short, and mushrooms [which have little nutritive value] and caterpillars are the main standby as additional relishes. In the late rains millet is practicably non-obtainable, and gourds and occasional maize-cobs are often the only available foods. Thus the diet changes completely in composition from one season to another -- a characteristic feature of primitive societies, of which the effects have not yet been investigated. Such essential constituents as are provided by the green vegetables, fruit, meat, and fish. . . are only available for short periods of the year.

Against this background that Richards describes, she says, "Caterpillars are obtainable everywhere during the wet season, and make quite a considerable contribution to the animal protein of this diet." Caterpillars swarm at different periods in different districts from October to April. They appear to be, from Richard's seasonal data, the most important single source of nutrients during the hunger months from November to February. Ants (termites?) and other insects are also available during October and November and honey from April through July and October into November. Seasonal availability of these insects in relation to other Bemba foods is shown in Zambia Table 1 (see Richard's unnumbered table, p. 41).

According to Richards (p. 408), the most common method of preparing caterpillars and other insects is by slow stewing with ground-nut sauce, the vernacular term being *ukusashila*. Insects may also be cooked dry which is called *ukusalula*.

Richards (pp. 409-410) provides information on the nutrient analysis of Bemba foods, including unspecified caterpillars (dried) and locusts (Zambia Table 2; see Richard's Appendix Table B, p. 409). At 65 g protein/100 g insect, dried caterpillars are by far the most concentrated source of protein in the Bemba diet. Comparable figures are 32 g for dried fish, 30 g for roast venison, 28 g for groundnuts, 26 g for dried leaves, 23 g for dried beans, 22 g for dried peas, and 21 g for haricot beans and dried cow-peas. Fresh mushrooms and fruits, which, along with caterpillars are the most widely available foods in December and January, contain only 2 g and 1 g, respectively, per 100 g. Thus the seasonal importance of caterpillars is evident.

White (1959) included edible insects in outlining the existing state of the economy of the Luvale (and the Luchazi and Chokwe) in the Balovale and Kabompo districts (North-Western Province) of Zambia. According to White (p. 16), there is a great range of local products which the environment provides for every-day use, but "this presumably early stratum in the Luvale economy must be viewed not as primitive subsistence but as one element in an economy which has become progressively more complicated with the passage of time through the establishment first of agriculture, and secondly of an exchange and cash economy." He suggests that although most African peoples collect the produce of the bush to some extent for food, the Luvale appear to exploit their sylvan resources much more effectively than many including the Bemba. It is noted also that the Lala of Serenje, studied by Thomson (see below), make but limited use of wild fruits and very little use of insect food in comparison with the Luvale. Insect foods discussed by White are included under the appropriate taxonomic categories below.

Moses Chakanga, a Zambian national, provided information on observations between 1975 and 1987 in the town of Kasama (Bemba people) in the Northern Province and in the town of Chipata (Ngoni people) in the Eastern Province (pers. comm. **1987**). Caterpillars and "flying ants" were harvested during the wet season (December to March) and grasshoppers during the dry season (June to October). The insects are captured by hand and placed in bags. Preparation is generally by frying in cooking oil.

S.K. Kumar (1990), of the International Food Policy Research Institute, Washington, D.C., stated regarding work they were doing on food consumption patterns in Zambia:

We have found very common use of foods such as caterpillars and flying termites in the diet of rural and peri-rural households. The former is much more common and is even widely available in dried form in local markets. The latter is much more a rarity, and is seasonally available only during the early part of the rainy season. However, both items have a seasonal pattern in their consumption. Even though we did not find the dietary use of other insects in the region of Zambia where we were working, it has also been reported that grasshoppers and crickets are occasionally eaten. The Zambian food composition tables [which are widely used by nutritionists in the country] include these items among the list of food items consumed and show their nutritional content. . . .

Kumar continues:

Overall, there seems to be a trend towards a reduction in the consumption of these foods. We

have made an assessment of the contribution of these foods in the diet, and have found it to be very small on an annual basis. However, it is very significant on a seasonal basis, and the time these foods are widely available is during the hungry season, and at that time provide an important source of quality protein in the diet.

Mbata (1995) provided the scientific names of more than 30 species eaten in Zambia, while stating that the identity of many species remains unknown. Entomophagy has gained greater prominence in Zambia in recent years as the result of poor economic conditions and a persistent drought. Large quantities of edible insects, especially caterpillars, grasshoppers and termites are brought from rural areas for sale in town markets. Entomophagy has been part of tradition "since time immemorial," especially in parts of the country where people do not traditionally keep livestock, and has no doubt played an important role in averting diseases such as kwashiorkor in young children. Mbata provides local names (used by 16 tribal groups) and describes methods of preparation (see under the appropriate taxonomic categories below).

Coleoptera

Cerambycidae (long-horned beetles)

Acanthophorus capensis (author?), larva

Acanthophorus confinis Laporte, larva

Acanthophorus maculatus (author?), larva

Mbata (1995) reported the above species and listed several local names. The white larvae are extracted by axe from drying tree trunks or dug from the ground and cooked without squeezing out the gut contents. Salt, tomato and onions may be added. The larvae may also be fried, but in their own fat as they are very fatty. Their unique flavors are derived from the gut contents, consisting mainly of wood particles.

Scarabaeidae (scarab beetles)

Pachylomera femoralis (author?), larva

Mbata (1995) reported that the grubs of *P. femoralis* and several other unidentified species of dung beetles are eaten. They are dug from the ground during the rainy season and are fried, salted, and used as relish.

Mbata also reports that many unidentified species of flower beetles are used. The heads and wings of the adult insects are removed and the remainder salted and fried and used as relish. Or, they may also be roasted.

Family unknown

Thomson (1954), who studied the Lala in the Serenje district, reported that a black wood beetle known as *amapembeya* which is found during the dry season is occasionally eaten, as is an insect (beetle?) known as the *iciense* which is dug out of the ground during the rains. **White (1959)** reports that large white larvae, which are probably coleopterous, are dug up in grass lands from September to December.

Homoptera

Cicadidae (cicadas)

Ioba leopardina (author?), adult

Platypleura stridula (author?), adult

Ugada limbalis Karsch, adult

According to **Mbata**, the above species are among several that are consumed. The wings are removed and the insects are roasted or fried in cooking oil or fat. Or they may be boiled and salted. Cicadas are also fed to chickens in some parts of Zambia.

Hymenoptera

Apidae (honey bees, bumble bees)

Apis mellifera adansonii Latr., larva

Apis mellifera capensis (author?), larva

Honey bee products of the above species are used, plus those of many other smaller bee species (**Mbata 1995**). Honey is an important sugar source for rural people, and it is also used to brew local liquor. The wax is used to make candles and to condition animal skins on the traditional drums. The larvae may be eaten with the honey, or they may be extracted, fried and consumed as relish with the main meal. Bumble bee (*Bombinae* spp.) honey can be extracted from tree trunks, but is not as popular as that of the honey bees.

Thomson (1954) notes (p. 43) that honeycomb is popular but not often found by the Lala in the Serenje district. "The comb is broken into small pieces and the honey extracted to be eaten alone or with thin porridge. The pieces of comb are then boiled for about half an hour to cook the small bees [larvae/pupae] inside and are eaten with relish."

White (1959: 13-14) states:

The Luvale make bark cylinder bee-hives (*jingoma*) which are put up trees so that wild bees may swarm in them. The same wild bees also nest in tree holes and termite mounds. In areas where bees are plentiful, their value is appreciated, and the collectors take care not to remove all the honey, so as to ensure the return of the swarm. . . . Honey is readily available from May to December, scarce in January, lacking from February to April. The Luvale use it eaten as it comes from the hive, ferment it into mead (*ndoka*), and eat the comb containing bee larvae (*chitana*). A number of small stingless wild bees also make honey, nesting in tree holes or in the ground.

The small stingless bees (White lists eight vernacular names) have a more limited honey season, from August to November. White provides the names of the major honey trees. Keen apiarists may have dozens of hives, located up to 20 miles from the village. Interference with a man's hives is considered a serious offense. Small shrines to their ancestral spirits are erected by bee-keepers to ensure a bountiful supply of honey.

Formicidae (ants)

Carebara vidua Sm., winged adult

To prepare, wings are removed if they were not shed during the nuptial flight, and the insects are then fried in their own fat. They are eaten as snacks or used as relish (**Mbata 1995**). They may also be boiled or eaten raw.

Isoptera

Termitidae

Macrotermes falciger Gerstaecker, winged adult

Macrotermes subhyalinus Rambur, winged adult

Macrotermes vatriolatus (Sjostedt) (= *vatriolatus*), winged adult

Odontotermes badius (Haviland), winged adults

Pseudacanthotermes spiniger Sjostedt, winged adult

In addition to the above five species, **Silow (1983)** suggests that three other species of *Macrotermes*, *M. mossambicus* (Hagen), *M. bellicosus* (Smeathman) and *M. natalensis* (Haviland) may be found and harvested in Zambia (p. 132). Silow states (p. 109):

The Mbunda, Nkangala, Lucazi, Luvale, Cokwe, and Yauma generally agree that the meat of [*Macrotermes* spp. winged sexuals] is better than meat of animals, birds, fish. Perhaps one or another of the edible caterpillars is comparable with them, but most of my informants are of the opinion that [*Macrotermes*] or honey is the best existing food. Some few persons simply do not like them. It is known that some missionaries have condemned winged termite eating as a heathen custom, yet, even one person who had previously told me that he was a Christian and thus would never taste such things, valued them as highly as non-Christians. . . . Bemba, Namwanga, Nyanja, and Nsenga I have met unanimously declare that [*Macrotermes* winged adults] are more delicious than anything else, or at least among the most delicious dishes.

Silow provides a text table (pp. 109-112) listing the peoples who eat *Macrotermes* winged adults, and notes that they are highly esteemed by the majority of ethnic groups in Bantu-speaking Africa. Silow also discusses the relatively few peoples who do not eat the winged termites (pp. 112-116). In tribes having termites as a totem, the termites may be forbidden food. Silow discusses in detail methods of collecting, cooking, preserving and

marketing winged *Macrotermes* (pp. 116-130). Silow reports that termite soldiers are considered to be inedible, at least in western Zambia (pp. 88-91)

Both Mbunda and Nkoya women use clay from *Macrotermes* mounds as medicine (Silow, pp. 92-93). The women regard clay eating as a means to "provide uterus with building material" and to "help it form the fetus properly." The amount of clay eaten ranges from only a little two or three times during the pregnancy to a handful daily. In sandy soil areas, the termite clay may be gritty, and clay nests of Mason wasps are usually used instead. Non-pregnant women may also eat termite clay when they feel weak. According to Silow, Munda and Nkoya men look upon clay-eating as a female habit, belonging within the realm of female medicine.

Winged *Pseudacanthotermes* and *Odontotermes* are eaten by the Mbunda and several other groups, but are not as popular as the *Macrotermes* even though they are said to taste the same (Silow, pp. 136-137). They are smaller and collected in smaller quantities. They are rarely stored because quantities are too small, and they do not enter trade.

The three *Macrotermes* species listed above are the largest of several species eaten (Mbata 1995). The freshly caught alates are placed in a pan and fried without adding cooking oil; a little salt is added. After frying, the wings are removed either by sifting the insects or by rubbing them between the palms. They are eaten as snacks or used as relish with a thick porridge (nsima). Fried termites can also be sun-dried for future use. And some termites are eaten raw.

Family uncertain

Richards gives the vernacular name of "ants" [termites] as *nkate*. They are plentiful as food in the months of October and November. **Thomson** mentions that in the villages she studied in the Serenje district, no one bothered to collect termites when they appeared at the beginning of the rains, although a few school children ate them at school. In several parts of the district, however, a species known as *Fibengele* is collected, dried and sold. According to **White**, flying termites (*tuswa*) are widely eaten by the Luvale during the rains; the termites store well for some days after collection, so large quantities can be gathered when they emerge. See also Chakanga and Kumar in Introduction.

Silow (1983, pp. 146-147) reports that *Microcerotermes* and other subterranean Amitermitinae (soldiers, workers and, sometimes, winged sexuals included) are considered medicine for fowl. He quotes his informants, "If you come across a carton-nest, you should carry it home, break it open and give it to your chickens. They are very fond of the inhabitants. They will be more healthy, and the hens will produce more chickens." Silow also reports (pp. 147-150) that *Trinervitermes* spp. (soldiers, workers, and winged sexuals sometimes included) are used as fish bait and bird bait.

Lepidoptera

Silow (1976) added greatly to knowledge about the use of caterpillars as food in Zambia. His ethnoentomological field-work was mainly based at Kalundu, a village cluster near Mangango in Kaoma District in Western Province, with shorter times spent in other provinces. He worked with the Nkoya, who are the original inhabitants of Kaoma District, and with the Mbunda and other ethnic groups who have migrated into the area over the years from Angola. Most of his informants were peasants who hunt, fish and gather for their household requirements, but who are all more or less influenced by changes in modern times including conflicts between foreign (mainly European) and traditional values and customs. A number of the species studied by Silow (mainly those whose scientific identity were determined) are discussed below under the appropriate families. The following few paragraphs are taken from his summary of the use of caterpillars as food (pp. 205-215).

Cultural factors determine whether caterpillars are regarded as edible. Of the groups studied by Silow, the Mbunda and Nkoya are caterpillar eaters, the Lozi are among the peoples who don't eat any at all. The Mbunda regard 31 kinds as edible, the Nkoya regard 12 kinds as edible. People say that the edible kinds were selected by the ancestors long ago, and they assume the ancestors had good reasons for not selecting some kinds. Aside from toxic forms, some are too small, too few, too protectively colored, too urticant, etc. The most important family is the Saturniidae; about half the species gathered by the Mbunda belong to this family. The richest forest type for caterpillar gathering in the Kalundu region is *Julbernardia paniculata* forest, followed by *Burkea africana*/*Erythrophleum africanum* forest. Caterpillars feeding on *J. paniculata* are thought to have a better taste than others. If a larva with several host plants, one of which is *J. paniculata*, is found on one of the other hosts, it may be moved to *J. paniculata* for a few days before harvest. The least-liked caterpillar is a limacodid called *kavambe*, but even it is more popular than, for example, fish. According to Silow, no kind of caterpillar can be regarded as famine food in the Kalundu region.

Caterpillars may be eaten as a snack, for which they are mostly roasted, or as a meat-course served with

porridge at a regular meal. They are preferred fresh, so only those not needed for a substantial meal are kept for preservation. Preserved caterpillars are often stewed with vegetables. People in the Kalundu region estimate that caterpillars are eaten as relish to the main meal averaging once every 3rd or 4th day during late September-March (only once a week during January-March for the Nkoya), once or twice every fortnight April-June, and none August-early September. Silow states that, "Caterpillars were one of the great trade articles of pre-colonial Africa. Local surplus was exported to regions deficient in caterpillars." The Mbunda are familiar with seven kinds that are marketed, all of which feed on dominant species of forest trees. Silow says that the increasing demand for caterpillars in the growing towns and attendant rising prices and cash payment have decreased the occurrence of regional bartering. Caterpillars are about 8 times as expensive in Lusaka and the Copper-Belt as at Mangango.

Silow describes how European influence has undermined the traditional attitudes toward caterpillars. He states:

In connection with the independence movement a reaction spread, especially in the towns, maintaining that caterpillars are excellent African food. The course of development, according to which modern, enlightened people should not eat the larvae, appears, however, to be stronger. Already at the primary schools many children learn from their teachers that caterpillars are bad food. Even if they generally keep the food habits of their parents, they have become a little hesitant about them. The pupils of the secondary schools, who spend their terms at boarding-schools with mainly non-African teachers, often refuse to eat caterpillars . . . More and more young people spend the time, which they formerly would have devoted to learning about nature, e.g. about caterpillars and hosts of caterpillars, or to collecting e.g. caterpillars, in going to school, in earning money at some more or less occasional work, in hanging about, in drinking beer, etc.

Silow also suggests why there has been a decrease in the supply of caterpillars and suggests measures that might be taken to counteract the trend. In this regard, he says, "However, all such arrangements are vain, if the children are not educated about edible caterpillars in their environment. In proportion to the great economic importance of the caterpillars the authorities have hitherto been little interested in them."

Thomson (1954) discusses use of caterpillars by the Lala tribe in the Serenje district, but, unfortunately, provides no scientific names. She states (p. 43):

The main caterpillar season is in November but small quantities are found at other times of the year, particularly the *imishila* variety in April. Caterpillars not only form a large part of the diet for three or four months of the year but also have an important commercial value. From November to January they form 40 per cent. of the relishes and from then until March 27 per cent. They can be sold for quite a good price to the Copper Belt or exchanged for grain, salt, tobacco, beads, soap or clothes. About a third of the people questioned . . . where large quantities are found, had used them for bartering.

Before cooking or drying the large varieties of caterpillars are 'gutted' by opening the mouthpart with a bit of stick and squeezing the caterpillar like a concertina between finger and thumb. If cooked fresh, the caterpillars are then washed, placed in a pot with cold water and boiled for one and a half hours. Salt is added. Caterpillars are dried after gutting by roasting over a fire for three to four hours and then spreading out on a mat in the sun for three to four days. They are stored in sacks or clay pots.

Before cooking they are washed in hot water and then placed in a pot with cold water and boiled for thirty minutes. Alternatively they may be roasted on the fire for a few minutes and eaten dry.

Thomson states (p. 33) that small numbers of caterpillars are found everywhere but the two largest and choicest types, *bamumpa* (black with yellow and white spots and black spikes) and *ifinkubala* (bright green) are found in quantity in one area only and for only a few weeks. People come from all over the district, even one or two days' journey, to collect them. Children climb the trees to collect the caterpillars, but adults select their tree by the quantity of droppings at the base and then chop the tree down in order to collect at a more convenient level. *Bamumpa* live on several kinds of trees but *ifinkubala* are found only on the *mutondo* (*Isobertinia paniculata*). Thomson states, "Large areas are completely devastated in the caterpillar season and unless this wholesale demolition can be stopped within a few years all the *mutondo* trees will have disappeared and the people will be saying of this area as they already do of others, 'A few years ago there were many caterpillars

here but now there are none." Thomson further states (p. 56), "Prohibited cutting of the *mutondo* trees during the caterpillar season is essential if caterpillars are to be conserved in the areas where they are now found."

According to Thomson (p. 50):

Practically all the protein in the diet is derived from vegetable sources. The only weeks when protein intake could be considered reasonably satisfactory were for the lake village December and January when quantities of fish and caterpillars were eaten; for village B October to November when they were collecting caterpillars locally; and for village C when they were eating large quantities of beans in February.

Thomson indicates (p. 49) that caterpillars are a good source of vitamins of the B complex in months when the caterpillars are eaten in quantity, but provides no data. She also mentions (p. 53) that only dried relishes, e.g. pulses, dried caterpillars fish and meat are taken to school from the villages. As for economic importance (pp. 54-55), the most profitable sales were caterpillars, which provided about 28 per cent of the total money obtained compared to grain (23%), pulses (20%), meat (15%), and hens (05%). Millet was the most frequently bartered item (33% of exchanges), while caterpillars were involved in 17% of exchanges.

White (1959: 12-13) gives 18 vernacular names of edible caterpillars used by the Luvale, the months when each is available and botanical names of their food plants. Caterpillars of one species or another are available for most of the year although abundance of a given species varies from year to year. Many of the food plants are a dominant element in the Luvale countryside. Most of them are not of great height, thus collecting caterpillars does not involve as much tree-cutting as is done in some parts of Zambia. Dried caterpillars are part of Luvale trading to urban centers of Zambia (p. 41) and a source of cash (p. 43).

Mbata (1995) states that many species of caterpillars, most with scientific identity unknown, are part of the human diet in Zambia. See also Kumar (1990) in the Introduction.

Lasiocampidae (eggar moths, lappets)

Catalebeda jamesoni B.-Bak, pupa

Pachypasa bilinea Walk., pupa

These two species (Mbunda term: *lingongolila*) have large caterpillars with severely urticant hairs, but edible pupae (**Silow 1976**, pp. 132-140). The host tree of *C. jamesoni* is *Pterocarpus angolensis* while the host of *P. bilinea* is *Julbernardia paniculata*, although the host range may be wider for both species. The pupae are traditionally edible for several ethnic groups, but the custom seems to be disappearing and is retained mainly by some older people. The pupae are roasted and eaten as relish with meals or as snacks. They were apparently never marketed. These are the most feared of the urticant caterpillars, and both larvae and cocoons (which have urticating hairs woven in) must be handled with extreme caution.

A well-liked caterpillar known as *cimbua* (scientific name unknown) may belong to this family. It feeds on *Swartzia madagascariensis*, *Brachystegia* type *longifolia*, and *Julbernardia paniculata*, and, according to Silow (pp. 126-131), is without question the caterpillar most often marketed in the Nkoya and Mashasha territories. "Cimbua larvae taken from the cocoons are considered to be the best of all caterpillars. Their fatness, the nice taste and the softness of their skin are praised. The aroma is compared with that of honey or nectar. The taste is compared with that of fried winged termites." A small gourd full of cocoons (1-2 liters) may be collected from the soil under the crown of a tree which has had *cimbua* larvae, or even double that amount may be collected under a single tree. A skilled collector can gather as much as 100 liters during a season. The preferred method of preparation is to roast the larvae in the cocoons. The cocoons burning over the embers give the larvae a "very nice smoked taste," which is made more distinct with addition of a little salt. *Cimbua* larvae are found in the markets only in the cocoons. They are in great demand. Until used, the larvae are stored in the cocoons where they remain alive and fat for at least two months. There is a brisk trade with larvae bought from villagers by traders who then sell them for much higher prices in town.

Limacodidae (slug caterpillars)

A limacodid caterpillar known as *kavambe* is eaten by several ethnic groups. Host trees are *Julbernardia paniculata*, *Brachystegia spiciformis* and *Baphia obovata* (**Silow 1995**, pp. 109-113). It is not one of the more popular species, and its use is apparently declining.

Noctuidae (noctuids)

Busseola fusca Hmps., larva

Heliothis obsoleta Fabr., larva

Sphingomorpha chlorea Cr., larva
Spodoptera exempta Walker, larva
Spodoptera exigua Hubner, larva

Larvae of *B. fusca* and *H. obsoleta* (known as *kanguengue*) from maize are traditionally eaten by the Nkangala (Silow 1976, pp. 146-160). They are eaten boiled or roasted without any preliminary preparation. Silow reports (pp. 38-43) that *S. chlorea* (known as *mbandama*) is a caterpillar of the *Burkea africana* forests fringing flooded plains, grasslands and dambos. *B. africana* is the sole host tree. The larvae appear in October preceding the rainy season. In some years the larvae become abundant, and in those outbreak years they may be eaten for several days in succession by a whole village. In most years, however, they are more scarce and are hard to detect. They are always eaten fresh and are boiled, never roasted. Preserved *mbandama* larvae are said to be tasteless. They are not found in the market.

As of recently, following several population explosions, the two *Spodoptera* species listed above are consumed in Zambia (Mbata 1995).

Notodontidae (prominants)

Anaphe infracta Walk., larva, pupa (less often)
Desmeocraera sp., larva

Silow (1976, pp. 114-125) gives an extended discussion of the use of this species. The host tree is *Pseudolachnostylis maprouneifolia*. The larvae are found during the dry season, about April-October, with main consumption in May-July. The larvae (Mbunda term: *liungu luanda*) are "savoury" and eagerly sought after by men, women and children. They are best if collected soon after the large communal silken bags are closed and before pupation occurs. Some tribes consider the pupa also edible, especially when newly-formed. If caterpillars are found far from the village when only beginning to build the communal nest, they can be collected and placed closer to home where nest-building will continue. If one has collected a large nest, it may be opened several times over a period of a week and only enough larvae removed each time as needed. No preparation is needed; the larvae are boiled or roasted as they are. Although larvae may be eaten frequently during the long season, according to Silow they are never sold on the market.

The host tree of *Desmeocraera* sp. is *Swartzia madagascariensis* and the season of the larvae (known as *liungu munienie*) is in the first part of the rainy season, about November-December (Silow 1976, pp. 54-56). Most ethnic groups eat the larvae and they are considered tasty but usually difficult to find in quantity. Only 5-10 meals of *liungu munienie* may be eaten in an average year. People prefer to not squeeze out the gut contents of the larvae in order to avoid waste of fat. Generally the larvae are boiled. They are not preserved as the catches are too small. They are not found on the market.

Saturniidae (giant silk moths)

Bunaea alcinoe Stoll, larva, pupa
Bunaeopsis sp., larva, pupa
Cinabra hyperbius (Westwood), larva
Cirina forda (Westwood), larva, pupa
Gonimbrasia belina Westwood, larva, pupa
Gynanisa maia (Klug) (= *maja* Klug), larva, pupa
Holocerina agomensis Karsch, larva
Imbrasia epimethea Drury, larva, pupa
Lobobunaea christyi Sharpe, larva
Lobobunaea saturnus Westw., larva
Micragone ansorgei Rothschild, larva

Likese, the caterpillar of *Gynanisa maia*, is considered delicious and is eaten by nearly all ethnic groups (Silow 1976, pp. 22-30). "It is praised for its enormous size, for its thick layer of fat, and for the nice taste." The pupa is also regarded as edible, except by the Nkoya and Mashasha who consider it inedible. The fully grown larvae have one important defect, however, from a culinary standpoint. The skin is very thick and leathery and people complain that they have to chew it for an unreasonable length of time. Some people like the tough skin, saying it is "juicy and nice," and one can chew it a long time before the taste is gone. Most maintain, however, that *likese* is best either when it is moulting or not longer than about 50-70 mm in length. The host tree is *Julbernardia paniculata*, and the larvae are found during, and before, the early rainy season, about October-November. People check for presence of larvae by looking for droppings under the host trees. Formerly, everybody, including the young, could identify at a glance the species of caterpillar by the size, shape

and texture of the droppings. In recent times, however, people may be confused about the species to which droppings belong, and old people complain that "profound ignorance has become so general."

When populations of *G. maia* are heavy a tree may be felled to collect the larvae. Or they can be collected as they descend the tree trunk to pupate in the soil, or from the soil itself. In outbreak years, it is easy to collect 20-30 l of *likese*. Because of the tough skin, fully grown larvae are easy to "squeeze" (to remove the gut) without waste of fat. The big *likese* pupa was traditionally a highly appreciated gift for old people. Silow mentions that, "Old folks at Kalundu report how they, when they were young, used to fill gourds with pupae for their aged relatives, and ask why this happens so rarely today." *Likese* larvae are among species sometimes found on the market.

The caterpillar of *Cinabra hyperbius*, known as *lizoto*, is eaten by the women and children of most tribes, but rarely by men. They consider it the food of women and children, and if a man happens to find some larvae he will bring them home for the children (Silow 1976, pp. 30-34). Half-grown children are the ones who devote themselves most to searching for *lizoto*. The pupa is not eaten, and the Nkoya and Mashasha consider the larva inedible. Host trees are *Julbernardia paniculata* and *Brachystegia spiciformis*. The larvae are collected in the middle of the rainy season, about January-February.

Linzinzi is one of the local terms applied to the caterpillars of *Lobobunaea christyi* and *L. saturnus*, which are eaten by most tribes but not by the Nkoya nor the Mashasha (Silow 1976, pp. 34-37). There are several host trees and the larvae are found in the middle of the rainy season, about January-February. The pupae are not eaten because, as with some other saturniid pupae, they are hard to find in the soil. The caterpillars are not as numerous as formerly and are usually caught in quantities sufficient for use only as a snack. They are roasted.

The very popular caterpillar known as *muyaya* is probably *Gonimbrasia belina*, according to Silow (1976, pp. 64-69). It feeds on *Julbernardia paniculata* and other trees, and is found before and during the early rainy season, about October-November. The pupa is also eaten by most groups, but not by the Nkoya nor Mashasha. Silow says that those who eat the pupa prefer it to the caterpillar. The caterpillar's spines makes squeezing them for removal of the gut a painful process. The caterpillars may be either boiled or roasted. Preserved, they are better than preserved caterpillars of some other saturniids. Old people report that in their earlier days, every household had about 5 liters of preserved *muyaya* caterpillars at the end of the season.

A larva known as *lixaxa* is probably the larva of *Bunaea alcinoe* (Silow 1976, pp. 70-73). It feeds on *Swartzia madagascariensis* and is found about February in the rainy season. Silow reports: "People dislike squeezing the *lixaxa* larvae, because of their spines. Generally the caterpillars are roasted. The spines are burnt off by the embers. It is too troublesome to boil them and then try to scrape off the spines, people say. The larvae are not preserved, because they are needed at this time of the year, when there is shortage of relish. Marketing is not known." Although the larvae are considered delicious, the pupae are even more highly appreciated.

A larva known as *likaulanzinzi*, which feeds on *Hyparrhenia* (Gramineae), is probably a species of *Bunaeopsis* according to Silow (pp. 73-76). It occurs during the latter part of the rainy season in February and March. Both larvae and pupae are eaten. It is not common except in outbreak years and is seldom preserved or marketed.

Kakomba, the larva of *Cirina forda*, is considered to be "a nice caterpillar," although not as savoury as some others (Silow, pp. 88-96). Both larva and pupa are eaten by most groups although the Nkoya and Mashasha regard the pupa as inedible. The larvae are found on the host trees, *Erythrophleum africanum* and *Burkea africana* before and in the early rainy season, about October-November. In outbreak years large, square-kilometer, areas of forest may be stripped of leaves. In large areas, *kakomba* is one of the most important edible caterpillars, and people make expeditions to collect it. Silow mentions that several people from different villages went to other localities and stayed with relatives for several days while searching for *kakomba*, and in other cases visiting relatives would bring quantities of *kakomba* with them. In an outbreak year, a single household will perhaps fill a gourd with 10 l of squeezed larvae. A single tree may yield about 1 l of squeezed larvae. Parts of larger catches are usually preserved for later use. Silow states that a few persons gather 5 or 6 sacks of *kakomba* larvae (each sack containing about 100 l) from localities along the Luampa River and take them to the Copper-Belt towns for sale on the market.

Silow mentions that it is well-known that some people get sick from eating *kakomba* larvae. Vomiting, dizziness or diarrhea may result. Precautions taken by those susceptible include boiling the larvae in from one to three changes of water, or once with ash-water. Everyone agrees that gathered *kakomba* larvae must absolutely be squeezed, including those moulting and ready to pupate because the gut liquid is bitter and possibly poisonous. *Kakomba* is always boiled, never roasted, as roasting does not neutralize the poison. The pupa, which causes no such trouble is usually roasted. Preserved larvae also cause no problem.

The local term, *cuva*, according to Silow (pp. 97-101), applies to the caterpillar of *Imbrasia epimethea*, possibly an additional species of *Imbrasia*, or a special form of *I. epimethea* on *Afrormosia angolensis*. Host trees, aside from *A. angolensis*, are *Julbernardia paniculata*, *Brachystegia longifolia* and *Erythrophleum*

africanum. It apparently appears three times during the year, with edible stages about December during the first part of the rainy season, again about February during the second part of the rainy season, and again about April, after the rains and before the cold season. It is one of the most common caterpillars, and although numbers fluctuate from year to year, no outbreaks occur on the scale of those of *kakomba*. The larvae are eaten by most ethnic groups, as are the pupae although the latter are regarded as inedible by the Nkoya and Mashasha. Larvae which feed on leaves of *J. paniculata* or *B. longifolia* are considered more savoury than those feeding on *E. africanum*, so an epicure who finds larvae on the latter may move them to the former and keep them feeding there for a couple of days before cooking them. *Cuva* is, like other caterpillars, best when it is moulting or ready to pupate. Much time is spent looking for *cuva* larvae, and they are eaten many times a year. Marketing of *cuva* occurs, but only rarely according to Silow.

Micragone ansorgei (known as *cingoyi*) is one of the urticant edible caterpillars. It is generally collected by women, but not as often as formerly, possibly because of the pain caused by the hairs when one is gathering it. Children avoid it because they are afraid of the urticating hairs. According to Silow (pp. 104-108), "Most men declare that *cingoyi* is women's and children's food, but the women often report that the men certainly eat it, when it is served." Many elderly women regard *cingoyi* as very useful because, needing relish they can often solve the problem by searching for *cingoyi* in the immediate surroundings. As hosts, the caterpillars prefer *Swartzia madagascariensis*, a low tree, and *Copaifera baumiana*, a shrub, but they also feed on other trees such as *Julbernardia paniculata*. They occur during the second part of the rainy season, about January-March. To prepare the larvae, they are put on embers to burn off the hairs. If captured while feeding, they are squeezed. Moulting larvae are often roasted directly and used as a snack. Otherwise, they are usually boiled and used as relish. According to Silow, preservation does not occur, nor does marketing.

The caterpillar of *Holocerina agomensis* (known as *lindengola*) is traditionally collected by the Nkangala, but never becomes abundant and is not one of the more important food species (Silow, pp. 108-109). The host tree (scientific identity unknown) is called *mundengola*. It is prepared in the same way as *cingoyi*, and as a rule is roasted.

A saturniid caterpillar known locally as *mumpa* (Bemba term) is highly relished by people in *miombo* woodland areas of Zambia and is undoubtedly the most important source of animal protein in areas where it occurs in abundance (Holden 1991). It feeds on *Julbernardia paniculata* and several other common trees in the *miombo* woodland. It is also an important source of income. A person can pick about 20 liters per day if the bush is rich in caterpillars and 7 days' picking, if all are sold, can earn the equivalent of a month's salary for a general worker in Zambia. It's not surprising that people travel 200-300 kilometers to pick caterpillars, and traders come from Lusaka and the Copperbelt (900 km) to buy the caterpillars which can be sold for a hefty profit when they return. Forestry officials have considered the caterpillars a pest, not so much because of deforestation, but because of damage done by people collecting them illegally in the national forests. Watchmen are hired to protect forests from this damage. The picking season is regulated by opening and closing dates, usually November 15 and December 15, respectively, but Holden notes that it is difficult to enforce the closing date because people find it "very difficult to stop picking this sweet relish!" The opening date is intended to ensure that the caterpillars are large before picking, the closing date to ensure that there is enough "seed" for next season.

Holden suggests that caterpillar husbandry on a communal basis would not only increase the production of *mumpa*, a valuable foodstuff, but would have favorable impact on woodland management. He observed that there are very few late bush-fires in areas where the caterpillars are found. In fact on one occasion when Holden was traveling with Zambian companions in caterpillar territory and a late fire was seen, his companions said, "A stupid guy has put it on fire, he wants to destroy our caterpillars." Fires late in the dry season when it is very dry and the trees have started to produce new leaves cause a lot of damage by killing trees, reducing regrowth and increasing erosion. Early burning is the best way to avoid this damage. The caterpillars provide the incentive for people to burn early, thereby protecting the caterpillars and enhancing woodland regeneration. Further, in areas where *mumpa* are now most abundant, there is not much regrown *miombo* woodland left. The bush is mostly 1-3 m high coppicing trees and bushes, and this seems an ideal environment for the caterpillars and for humans harvesting them without any cutting or climbing of trees. Silow (1976, p. 69) indicates that *mumpa* caterpillars may be *Gynanisa maia*.

Larvae of *Gonimbrasia belina* and *Gynanisa maia* are commonly consumed in Zambia (Mbata 1995). Mbata lists many vernacular names, but without associating them with specific scientific names.

Sphingidae (sphinx or hawk-moths)

Herse convolvuli (Linn.), larva

Nephele comma Hopffer, larva, pupa

The larva of *N. comma* (known as *cikilakila*) is highly appreciated as food. (Silow 1976, pp. 1-10). It is

said that "when one has eaten one *cikilakila*, it is hardly possible to check oneself, before all the caterpillars in the pot are finished." The pupa is rated as high as the larva by most ethnic groups, although the Nkoya and Mashasha regard it as inedible. The host tree is *Diplorhynchus condylocarpon* and the larvae are found before and during the early rainy season, about September-November. Populations fluctuate from year to year but the average quantity of prepared larvae eaten fresh is estimated at about 3 l per household per year. In addition, in a good year about 2 l of larvae may be preserved for later use, although preserved larvae are relatively tasteless. The author describes the larvae as difficult to prepare and cook because of the soft body and skin. *Cikilakila* is marketed, but not regularly.

By tradition most ethnic groups eat the caterpillar of *H. convolvuli* (known as *liungu kandolo*), but it is now eaten mostly by older people (Silow 1976, pp. 11-14). *Liungu kandola* is considered to be as delicious as *cikilakila*, but it occurs in smaller numbers and is less appreciated. It is not marketed. The larvae feed on bindweeds (Convolvulaceae) and sweet potato (*Ipomoea batatas*), and are found in the late rainy season, about December-February. The Nkoya find more larvae than the Mbunda, because they are more involved in sweet potato cultivation. Although the larvae devour leaves, they are not considered noxious, as new leaves quickly develop. According to Silow, people say that "it is a good thing that the larva eats such well-tasting food, thereby becoming a dainty morsel itself. Stewed leaves of sweet potato and of bindweed are regarded as very nice food, even if the latter are not used today. But the larvae are even much nicer."

Miscellaneous Lepidoptera

According to **Richards**, the vernacular names of seven main kinds of edible caterpillars are *ifishimu*, *icipumi*, *mumpa*, *nsenga*, *namusuluka*, *mpsumbata*, and *fitolo*. **Mbata** lists some of these and dozens of others. Regarding preparation of caterpillars for use, Mbata notes that some species are boiled or fried as caught, while others require removal of the gut contents because they are either unpalatable to humans or even toxic. Freshly caught caterpillars may be fried, with salt added. Onions and tomatoes may also be added. The insects are eaten as a snack or as a relish. For future use, freshly caught insects are cleaned, boiled and then sun-dried. They can be stored for as long as a year depending on storage conditions. Sun-dried caterpillars are used by soaking them in salted warm water until soft, then they are fried.

See also Chakanga in the Introduction.

Orthoptera

Acrididae (short-horned grasshoppers)

Acanthacris ruficornis Fabr., adult
Acorypha nigrovariegata (author?), adult
Acrida sulphuripennis Gerstaecker, adult
Afroxyrrepes sp., adult
Amblyptymus sp., adult
Cardeniopsis guttatus (author?), adult
Catantops ornatus (author?), adult
Catantops sp., adult
Cyathosternum sp., adult
Cyrtacanthacris aeruginosa (author?), adult
Cyrtacanthacris septemfasciata Serville, adult
Cyrtacanthacris tartaria (author?), adult
Locusta migratoria (author?), adult
Locusta migratoria migratoroides Reiche and Fairmaire, adult
Locustana pardalina (Walker), adult
Oedaleus nigrofasciatus (author?), adult
Ornithacris spp. (2), adults
Poecilocerastis sp., adult
Schistocerca gregaria Forskal, adult

White (1959: 14) lists many grasshoppers (*vambimba*) (most to genera only) which are eaten by the Luvale and provides the specific vernacular names. They are collected mainly by women in the dry season, July to October, when the grass has been burned, and according to White, mainly when other protein is in short supply. Locusts are eaten when invasions occur, but with modern control invasions are largely a thing of the past. White notes that the foul-smelling *kalunga* (*Phymateus* and *Zonoceros* spp.) are not eaten nor are a number of others for which White gives generic and vernacular names.

Mbata (1995) lists many of the species above while stating that many species eaten in Zambia are yet unidentified. In preparation for use, wings are removed and the insects are roasted, boiled or fried. Salt is added. Boiled insects may be sun-dried and stored for future use. When used at a later date, the dried insects are eaten as snacks or further boiled and tomatoes and onions added. Cooking oil or fat may also be used.

Locusts are known as *amakanta* (**Richards 1939**). See also Chakanga and Kumar in the Introduction.

Gryllidae (crickets)

Acheta spp., adults

Brachytrupes membranaceus Drury, adult

Gryllus (= *Liogryllus*) *bimaculatus* De Geer, adult

Crickets are known as nyense (**Richards 1939**). **Mbata** provides other local names. For preparation of *B. membranaceus*, wings are clipped off and the insects are fried, salted and tomatoes and onions may be added. They are served as relish to the main meal. The other crickets are roasted or fried and eaten as a snack or relish. **White** states that ground crickets (*tuzeze*) are dug up and eaten from January to April. See also Kumar in the Introduction.

Tettigoniidae (long-horned grasshoppers)

Ruspolia differens Audinet-Serville (= *Homorocoryphus nitidulus vicinus*), adult

Wings are removed and the insects are salted, fried or roasted (**Mbata 1995**). They are consumed directly or stored for future use. They are eaten as snacks or as relish to the main meal.

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Zambia Table 1. Seasonal changes in the food supply of the Bemba in Zambia (Richards 1939)

Wet Cold Hot Wet J F M A M J J A S O N D

Gardens

Millet z X X X X X X z z

Maize z X z

Kafir corn z X z

Cucurbits z X X z

Ground-nuts z X X X X X z z

Legumes (fresh) z X X X X z

Legume leaves (fresh) z X X X X X z

Sweet potatoes X X X X X X X

Wild spinaches z X X X X z

(Bush)

Mushrooms X z z X

Orchids z X X z

Fruit X X

Meat X X X

Fish z X X z X X z X z

Caterpillars X z z z z X X

Ants and etc. X X

Honey X X X X X z

X = plentiful; z = relatively scarce.

Zambia Table 2. Composition of insect foods in the Bemba diet (adapted from Richards 1939).

| Caterpillars | |
|------------------|----------|
| Nutrient(dried) | Locusts |
| Protein (%) | 65.0 8.0 |
| Fat (%) | 5.0 7.9 |
| Carbohydrate (%) | 0 0 |
| Calcium (%) | 0.16 |
| Phosphorus (%) | 0.77 |
| Iron (mg/100 g) | 7.3_ |