

**Chapter 13****SOUTHERN AFRICA: ZIMBABWE****Taxonomic Inventory**

Taxa and life stages consumed

**Coleoptera****Buprestidae (metallic woodborers)***Sternocera funebris* (author?), adult*Sternocera orissa* Buquet, adult**Scarabaeidae (scarab beetles)***Lepidiota* (= *Eulepida*) *anatine* (author?), adult*Lepidiota* (= *Eulepida*) *masnona* (author?), adult*Lepidiota* (= *Eulepida*) *nitidicollis* (author?), adult**Miscellaneous Coleoptera**

Scientific name(s) unreported

**Hemiptera****Pentatomidae (stink bugs)***Euchosternum* (= *Haplosterna*; = *Encosternum*) *delegorguei* (Spinola) (= *delagorguei*), adult*Pentascelis remipes* (author?), adult*Pentascelis wahlbergi* (author?), adult**Miscellaneous Hemiptera**

Scientific name(s) unreported

**Homoptera****Cicadidae (cicadas)***Loba leopardina* (author?)**Hymenoptera****Apidae (honey bees)***Trigona* spp., larvae**Formicidae (ants)***Carebara vidua* Sm., winged adult**Isoptera****Termitidae***Macrotermes falciger* Gerstaecker (= *goliath*), winged adult, soldier, queen*Macrotermes natalensis* Haviland**Lepidoptera****Lasiocampidae (eggar moths, lappets)***Lasiocampid* sp., larva**Limacodidae (slug caterpillars)***Limacodid* sp.**Notodontidae (prominents)***Anaphe panda* (Boisdv.), larva**Saturniidae (giant silkworm moths)***Bunaea* (= *Bunea*) *alcinoe* (Stoll), larva*Bunaea* sp., larva*Cirina fordai* (Westwood), larva

*Gonimbrasia belina* Westwood, larva  
*Goodia kuntzei* Dewitz (?), larva  
*Gynanisa* sp. (?), larva  
*Imbrasia epimethea* Drury, larva  
*Imbrasia ertli* Rebel, larva  
*Lobobunaea* sp., larva  
*Microgone* sp., (?), larva  
*Pseudobunaea* sp. (?), larva

### **Sphingidae (sphinx or hawk-moths)**

*Agrius* (= *Herse*) *convolvulus* (Linn.), larva

### **Miscellaneous Lepidoptera**

Scientific name(s) unreported

## **Orthoptera**

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

*Acanthacris* (= *Acanthracis*) *ruficornis* (Fabr.)  
*Acrida bicolor* (Thunberg)  
*Cyathosternum* spp.  
*Cyrtacanthacris* (= *Nomadacris*) *septemfasciata* (Serville), nymph, adult  
*Locusta migratoides* (author?), adult  
*Locusta migratoria* (Linn.), adult  
*Ornithacris cyanea* (Stoll), adult  
*Truxaloides constrictus* (Schaum)

### **Gryllidae (crickets)**

*Acheta* sp.  
*Brachytrupes* (= *Brachytrypes*) *membranaceus* Drury, adult

### **Gryllotalpidae (mole crickets)**

*Gryllotalpa* (= *Curtillia*) *africana* (author?)

### **Tettigoniidae (long-horned grasshoppers)**

*Ruspolia* (= *Homorocoryphus*) *differens* (= *nitidulus*)(author?)

**Duncan (1933:** 103) discussed edible insects as part of native diets under the category "Savoury," along with monkey nuts, mushrooms, tomatoes, melon seeds, eggs, etc. Locusts, or *madzomba*, after being boiled, are dried, fried, and eaten with the *sadza*. Duncan described the preparation of *sadza* as follows: "Water is placed in a pot and is left on the fire until it reaches boiling point. Mealie meal is then taken and added gradually and stirred until the mixture becomes thick and stodgy, resembling under-cooked bread. The pot is then removed from the fire, and the porridge (*sadza*) is then left for awhile to cool off a bit before being eaten." Flying ants (*ishwa*) are cooked in the same manner as locusts. Caterpillars, known as *madora*, *magandare*, *nowa*, *mashonjwa*, *arati*, and *zuwisi* are also prepared similarly to locusts. Unlike Europeans, only two meals per day are eaten, one in the early morning, the other in the late afternoon or early evening.

**Jackson (1954:** 64-66) listed 25 vernacular names for insects in four orders that are consumed by natives in various parts of the country: Coleoptera (beetles), *nyenze*, *mandere*, *gumbukumbu* or *gakata*; Hymenoptera (ants, but some of the names appear to apply to termites), *majuru*, *shwa* or *hwa* or *iswa*, *tsangarapfuta* or *tsangarafuta*; Lepidoptera (caterpillars), *mashonja*, *harati*, *madora*, *pferepfe*, *nhowa*, *masenda*, *ndambakurayira*, *ndanjeranje*, *nhongotowa*; Orthoptera (locusts, general names = *mashu* or *whiza*), *bambomukota* or *bombomukota*, *hanganwa*, *mhotanegwenzi*, *borimori*, *mamunye*, *munjepunje*, *madzomba*, *tsunwa*; (crickets), *gurgwe*, *ndororo*. Jackson mentions that in his youth, he often ate certain locusts, ants, roots, mice, crickets and fruit, but was not up to trying caterpillars. He classed the flavor of locusts and crickets as only fair.

**Gelfand (1971:** 1-7) gives a concise and excellent critique of African diets as influenced by tradition and the European attitude. Gelfand discussed a number of insect species that are included in the diet of the Shona (pp. 163-171) and the percentage of the population that includes them (pp. 194-199). His information is summarized below under specific insect orders.

Gelfand (pp. 194-199) described previously unpublished studies which revealed the degree to which

insects are included in the diets of different segments of Shona society. In recording data from people admitted to Harare Hospital which draws mainly a large urban population, Gelfand found that most of the patients with nutritional diseases came from rural areas, and more came from European farms (laborers) than from urban areas. Similarly, of 30 cases of classical kwashiorkor admitted to his care, 17 were from rural areas, 9 from European farms and 4 were urban. As a result of these observations, a study was conducted to determine the frequency with which first class protein was consumed (Zimbabwe Table 1; see Gelfand's Table 3, p. 196) by the different groups: Grade I, very good, first class protein daily with each main meal; Grade II, good, first class protein at least three days a week with the main meal; Grade III, fair, first class protein once or twice a week; Grade IV, poor, no first class protein during the week. The diet in the rural areas and on European farms again appeared to be less adequate, in general, than in urban areas.

In a follow-up survey, Gelfand inquired of urban and rural Shona as to whether they still ate the more "unusual" types of protein such as mice, caterpillars and flying ants, and whether the traditional avoidance of eggs was being maintained. The results (Zimbabwe Table 2; see Gelfand's Tables 5 and 6, page 198) showed that in both rural and urban areas, the Shona still eat mice, caterpillars and flying ants (termites) and that the latter seemed to be the most popular. Although the majority, mostly women, admitted to eating eggs, this was done only occasionally and eggs are not yet an important source of protein in the Shona diet.

**Chavunduka (1975)** briefly discusses many insects that are included in the Shona diet although he states that his list is not comprehensive. He notes that a decline in insect populations is imminent as the result of ecological changes involving bush clearance for settlement and agriculture and the consequent disappearance of many indigenous trees and grasses on which the insects feed, and secondly as the result of the use of insecticides. Species discussed by Chavunduka are arranged below under their respective insect orders. Vernacular names, except where otherwise indicated, are Shona terms. Chavunduka concluded that insects are the cheapest source of animal protein for the poor rural communities and urges that their use as food should be encouraged. In his opinion, insects have averted many potential cases of kwashiorkor in the remote rural areas.

The following interesting culinary event was reported in a 1988 Zimbabwe newspaper article datelined Domboshawa, Zimbabwe:

White ants were out of season, but caterpillars, locusts and flying ants substituted nicely in a contest for cooks demonstrating how to feed a family of five for less than a dollar. First prize was a bicycle. The *piece de resistance* was sauteed matsimbi, yellow and black caterpillars four inches long, served with the national staple called sadza, a ground corn cooked into a stiff porridge.

Zhinji Nyikadzino won the bicycle for a stew of home-grown greens, tomatoes and onions seasoned with dovi, a version of peanut butter, and served with the ubiquitous sadza. She accompanied it with a nutritious drink made of rapoko greens.

Relative to possible efforts toward greater development of food insect resources in Zimbabwe, **DeFoliart (1989)** quoted from a 1987 personal communication from Professor R.J. Phelps (University of Zimbabwe): "The time may well be ripe in this country. . . . Certainly, dried caterpillars of saturniid moths are sold on the local market, and consumption of termites, locusts and tettigoniids by the vast majority of the population continues in spite of the presence of western cultures. In fact, many people of European background eat termites here, although not in the quantities that the local people do."

**Wilson (1989: 2-6)** states that gathered wild foods play a daily role in rural diets in southern Africa and are most important for making the relish that accompanies the characteristic stiff cereal porridge. The great miombo forest region extending from Angola across Zambia to Mozambique and down into Zimbabwe has two peculiarly valuable food resources, mushrooms and caterpillars. Where the forest remains these provide an important relish during the rains and are dried for use later in the year. In the deforested areas the tree-associated mushrooms disappear, except those symbiotic with termite species (mainly *Termitomyces* spp.) which remain important. In the deforested areas several caterpillar species that consume grasses and herbs, and certain edible crickets and other orthopterans are regularly consumed. For example, the sphingid moth caterpillar, *Herse convulvuli*, which feeds on weeds of the genus *Convulvulus* is abundant in southern Zimbabwe. *Brachytrupes membranaceus* is the most common cricket eaten, but there are several others as well as many types of grasshoppers. The katydid, *Ruspolia differens* deserves special mention as it has been swarming across southern Africa in recent years.

Wilson mentions that although fungi are less common outside of the miombo region, several species of caterpillars, notably the 'mopane-worm' (*Gonimbrasia belina*), are very important in the semi-arid regions. This species is generally common, although its populations fluctuate wildly, wherever there are extensive areas of its host tree *Colophospermum mopane*, which is most common in lower and drier areas. Very substantial urban

markets exist for fungi and caterpillars in the towns all over the region. Regional international trade in caterpillars has a long history, and a number of large industrial concerns have more recently started to deal in dried and tinned caterpillars. Jassbro Ltd. operates out of Bulawayo in Zimbabwe, and in mid-1986 was charging Z\$6/kg of dried caterpillars (equivalent at that time to UK£2.50). A few other insects are mentioned by Wilson, including flying ants (termites) which are a major protein and fat source for people during the early rains, and various beetles, bugs (hemipterans) and locusts which are of local seasonal value.

Relative to agro-ecological changes resulting in shifts in the species composition of wild food resources, Wilson states (pp. 18-19): "Deforestation, for example, leads to dramatic losses in edible caterpillars and fungi.

Yet the grasslands and the fields that replace them support some different types of caterpillars, more grasshoppers and crickets, and more grazing mammals, including buck, rodents and hares."

**Wilson (1990)** notes, relative to the nutritional value of insects used as food in Zimbabwe, that a number of the species eaten in large quantities have a very high fat content. The importance of this is that people living on a predominantly millet diet take in even less fat than those living predominantly on maize. Most of the insects are consumed opportunistically, especially by children, and only when a species is temporarily abundant is it gathered for use as a relish. Wilson (pp. 567-581, 620-622) provides information on local names, food plants or vegetation association, ecological zones, seasonal occurrence and present status of many Zimbabwe edible species, some of which is summarized below under the appropriate orders and families.

As part of a study in the Shurugwi Communal Area on the effect of deforestation on strategies of woodland use and management in Zimbabwe's communal areas, **McGregor (1991: 265-271)** provides information on edible insects similar to that by Wilson and on many of the same species (see under the appropriate taxa below). McGregor concludes that past land use policy has had a lasting and detrimental effect on woodland cover in the study area, and she states (p. 1):

Centralised institutions and the authority of science have contributed to the devaluation of local understandings and the underappreciation of the dynamism of use strategies. Planning has persistently been based on misunderstandings of savanna ecology and the way it is used. . . . In contrast with state interventions, local strategies for coping with environmental change can be highly effective in resource conservation. Many changes in resource use, however, are rooted not in physical scarcity but in broader political, economic and lifestyle changes, and in a desire for modernity. State agents have an increased role in determining woodland usufruct in the study area. There has been a decline in the authority of spirit guardianship of woodlands and an increase in the use of privatised resources.

McGregor agrees with Wilson that although insect populations dependent on woodland, such as most caterpillars, are diminishing in dietary importance, other insect populations are increasingly important, particularly those favoring arable and disturbed ground. Of four species now widely marketed, there are two in each category, two species of caterpillars, a cricket and a katydid (see under the appropriate taxa).

## Coleoptera

### Buprestidae (metallic woodborers)

*Sternocera funebris* (Author?), adult

*Sternocera orissa* Buquet, adult

Two buprestid beetles, *Sternocera funebris* and *S. orissa*, known as *magakata* are collected in the Spring, similarly to, but in lesser numbers than the Christmas beetle described below (**Gelfand 1971**). The head, wings and legs are discarded before preparation.

According to **Chavunduka**, *S. funebris* and *S. orissa* are known as *zvigakata*, *rumagotsi*, or *dandaruma*. The larvae feed on *Brachystegia spiciformis*, *B. tamarindoides*, and *Julbernardia globiflora*.

### Scarabaeidae (scarab beetles)

*Lepidiota* (= *Eulepida*) *anatina* (author?), adult

*Lepidiota* (= *Eulepida*) *masnona* (author?), adult

*Lepidiota* (= *Eulepida*) *nitidicollis* (author?), adult

*Eulepida masnona* [or *mashona* as spelled by Chavunduka?], which is a crop pest, is known as the Christmas beetle, *mandere* or *chafer*, and is eaten as a relish (**Gelfand 1971**). The beetles emerge from the ground at the beginning of the rains in summer and are found on the leaves of the young *munhondo* and *musasa*

trees. The women collect the beetles by hand and remove the legs before putting them into baskets. After being washed they are grilled; when cooked to about half their original size, a little water and salt are added and they are grilled a little longer.

According to **Chavunduka**, three chafer beetles are used, *Eulepida anatina* and *E. nitidicollis*, in addition to *E. mashona*. All are known as *mandere*. Their food trees are *B. spiciformis* and *J. globiflora*. The chafer beetles are collected by spreading a white cloth under the tree and shaking the tree vigorously. The beetles are collected early in the morning when they are less active. **Wilson (1990)** mentions the species (as *Eulepidida masnana*) as common.

### Miscellaneous Coleoptera.

See Jackson (1954) and Wilson (1989) in the Introduction.

## Hemiptera

### Pentatomidae (stink bugs)

*Euchosternum* (= *Haplosterna*; = *Encosternum*) *delegorguei* (Spinola) (= *delagorguei*), adult

*Pentascelis remipes* (author?), adult

*Pentascelis wahlbergi* (author?), adult

**Mjele (1934)** reported that the *harugwa*, or *Haplosterna delegorguei* is a highly prized delicacy among the natives of the Bikita district who prefer them to either the brown or red locusts. The *harugwa* arrive in a dense mass from unknown breeding grounds apparently to the south and usually toward the end of the rainy season. They feed on the leaves of wild loquat trees which occur in dense groves in the area. The insects, which have a strong musk-like odor, are prepared by first steeping them in hot water to kill them. Pressure is then applied to the thorax to remove a certain secretion which is unpleasant to the palate. They are then roasted on an open fire and placed on a granite out-crop to dry. They are usually eaten with other food, only "gourmands" eating them as a separate dish. According to Mjele, the *harugwa* continue from April to September, when, with the approach of the rains, they fly southward.

According to **Cuthbertson (1934)**, *Haplosterna delegorguei* (Spinola) is one of 10 species of pentatomids that have the habit of congregating in enormous numbers in Zimbabwe. They appear in swarms on certain trees (*Mahobohobo* or *Uapaca* sp.) in March or April in the Belingwe and Bikita districts and are the cause of serious quarrels among the natives of neighboring kraals who use them as food.

**Chavunduka** states that, in the Bikita district, *Encosternum delegorguei* (*harurwa*) is much sought after and can be bartered for grain. The species is mentioned as common by **Wilson (1990)**. According to Chavunduka, *Pentascelis remipes* (*magodo*) feed on *Combretum molle* and *C. imberbe* (*mugodo*) and are a delicacy among the Manyika and Ndau tribes. *P. wahlbergi* (*nharara*) feed on *Gardenia resiniflua* (*mutara*) and occur in clusters.

### Miscellaneous Hemiptera.

A common "bug" associated with *Gardenia spatulifolia* trees and known as *nharara*, and another "bug" known as *bembere* and associated with *Combretum sollis* and *C. fragrans* are mentioned by **Wilson (1990)**. See also Wilson (1989) in the Introduction.

## Homoptera

### Cicadidae (cicadas)

*Loba leopardina* (author?)

*Loba leopardina* (*nyenze*) feeds on *Albizia antunesiana muriranyenze* (**Chavunduka 1975**). *Nyenje* (= *nyenze*) is mentioned by **Wilson (1990)** as common.

## Hymenoptera

### Apidae (bees)

*Trigona* spp., larvae

**Gelfand** discusses the collection and use of honey produced both by *Apis* sp., called *nyuchi* by the Shona,

and by several species of *Trigona* bees, known as *monga*, *hwadza*, *mwanda*, *mbadzi*, *nhona*, and *kanyira*. From Gelfand's discussion (pp. 163-164) it is not clear whether the Shona use bee brood as food. Three kinds of hive are recognized which are called *mukuyo* (honeycombs), the *machinda* (bee pupae), and the *pfuma* (royal jelly). Gelfand states, "Only the *mukuyo* honey is taken home, that from the *machinda* hive is either eaten on the spot or thrown away and that from the *pfuma* eaten there and then." A cake-like mass made from honey boiled with millet, and called *chihungwe*, is eaten as a delicacy or may be taken to other villages and sold or bartered for grain.

**Wilson (1990)** discusses honey gathering and also possible factors affecting the changing abundance of honey-producing insects. Although he makes no direct mention of bee brood being consumed, such is implied by his statement that: "Honey, however, contributes only carbohydrates [to the diet], except to the extent that larvae, etc. are also consumed."

### Formicidae (ants)

*Carebara vidua* Sm., winged adult

**Gelfand** notes that the tree ant, *Carebara vidua*, known as *tsambarapfuta*, emerges from anthills for only a few days when rain comes. It is eaten as a relish. According to **Chavunduka**, *C. vidua* (*tsambarapfuta*), the "flying ant" is often collected by the young and may be eaten raw. **Wilson (1990)** mentions it (alate females) as common in the rainy season. Also see Jackson (1954) in the Introduction.

## Isoptera

### Termitidae

*Macrotermes falciger* Gerstaecker (= *goliath*), winged adult, soldier, queen

*Macrotermes natalensis* Haviland

**Gelfand** (p. 168) refers to the *ishwa* and *majuru* of Jackson as the flying adults and soldiers, respectively, of *Macrotermes goliath*. The flying adults appear in the summer at the beginning of the rains, usually in December, and Gelfand describes the collecting procedure:

In order to gather them the men dig a small hole into the anthill, large enough to insert a small claypot about ten inches high. The pot has a little hole in its bottom communicating with the earth below. Several small sticks are laid across the top, covered with leaves of the *gumbakumba* bush (*Eriosema shireense*). All other holes in the anthill are sealed to force the ants to enter the pot to which they are attracted by the daylight or moonlight shining into it. When they come through the opening of the pot just after dark the women and children catch them in their hands. . . . When the woman has filled a calabash with them she closes the opening with grass and takes home her spoil.

The termites are grilled with a little salt added, winnowed to remove the wings, and served as a relish with the porridge.

**Chavunduka** mentions *Macrotermes falciger* (*ishwa*) soldiers and winged adults as food. The soldiers are collected by opening out the mouth of the nest and inserting long blades of grass or split reeds into the tunnel. The soldiers clamp into the grass with their large mandibles. The grass is withdrawn and the soldiers are shaken into a collecting vessel. As described by Chavunduka, the flying adults are collected as follows:

A trench is dug on the slope of the anthill in such a way that the mouth of the nest is at the highest point. A wide mouthed earthen pot, with water, is placed at the lower end of the trench. The trench is roofed over with grass except for a small window which admits a little light at the bottom end. As the termites leave the nest they fly to the bottom of the trench where they are trapped and collected in the earthen vessel.

For eating they are roasted in the earthen pot. Chavunduka cites studies on weanling rats by S.J.L. Moyo as evidence that termites (*M. falciger*) are a rich source of lysine and therefore are a good supplement to the maize meal in the traditional African diet.

**Cmelik (1969a)** reported that lipid content averaged 25% in both male and female alate *Macrotermes goliath* on a fresh weight basis. Moisture content was 47%, so lipid content on a dry basis was 47%. Size of both sexes ranged from 180-280 mg; based on the average weight of 250 mg, lipid content averaged 60 mg per termite. Semi-quantitative determinations showed about 60% of the total body lipids contained in the fat body,

6% in thoracic muscle, 5% in the gut, 5% in the reproductive organs, 2% in the head, and 22% in other parts of the body. All organs contained the same fatty acids, C16:0, C18:0, C18:1, and C18:2, in variable proportions, but C18:1 was the predominant fatty acid in all organs. Quantitative determinations of free and esterified cholesterol were carried out on the neutral lipid portion of the total body lipids (Zimbabwe Table 3; see Cmelik's Table 3, p. 845), and the low percentages for alates are due, according to Cmelik, to the presence of the very large fat bodies which contain very little cholesterol. Soldier termites yielded a low content of cholesterol esters while workers were exceptionally high in all cholesterol fractions. Body lipids of soldiers and workers also differed from those of alates in having a high content of hydrocarbons and only small quantities of glycerides.

**Cmelik (1969b)** similarly studied the neutral lipids from termite queens, i.e., *Macrotermes natalensis* and *M. falciger*. The cholesterol content of lipids from the reproductive organs was much lower than that found earlier in other castes of *M. falciger*, but considerably higher than found in reproductive organs of alates. In *M. natalensis*, 72% of the total body lipids is contributed by the reproductive organs while only 22% comes from the fat bodies. In *M. falciger*, the percentages are 83% and 11%, respectively. The eggs, which constitute the bulk of the reproductive organs, are responsible for the large quantities of lipids in those organs. All organs contained C16:0, C18:1, and C18:2 as major fatty acids, while C16:1, C18:0, and C18:3 were present in smaller quantities. Live queens collected from excavated mounds weighed 8-10 g, according to Cmelik.

**Phelps et al (1975)** investigated the protein quality of the alate (winged) form of the termite, *Macrotermes falciger* collected near Harare. The protein and fat composition of wingless wet mass was found to be 21.2 and 22.5%, respectively, and of wingless dry mass 41.8 and 44.3%, respectively. Amino acid analyses are shown in Zimbabwe Table 4 (Phelps et al Table 2, p. 126). In a rat feeding trial, the protein efficiency rating (PER) for lightly fried termites was 1.7 compared to 2.4 for casein, the quality of termite protein thus appearing somewhat low (some generally used PER values are 3.5 for fish, 2.5 for casein, 1.7 for groundnuts, 1.5 for wheat and 1.1 for maize). In a rat feeding trial with fat-extracted termites, the digestibility of the termite protein was low compared to a casein control (51 vs 84%). Several factors may have affected the outcome of the tests, but it appears that rats have a restricted ability to digest termite protein. The calorific value reported for *M. falciger*, 761 kcal/100 g on an ash-free basis was extremely high and, according to Phelps et al, possibly the highest yet reported for an insect. Phelps et al note that the applicability of these results to other termites and termite castes remains to be determined.

**Wilson (1990)** describes collecting and cooking methods for alate termites (presumably mainly *M. goliath*) which emerge in tremendous numbers, mostly at night, during the rains, especially when there are heavy early rains. They are grilled/fried without additional fat (or may be eaten raw), and the wings removed by winnowing. They are storable for later use. Sales are considerable, and the alates "seem to be consumed in very large amounts by people of all wealth and age categories." Soldier termites are eaten during the hot dry season, and Wilson describes their collection using grass, reed or sedge stalks (*Cyperus* is preferred) which have been smeared with saliva. Soldier termites are collected mainly by small groups of old women, often assisted by small children. They are used as relish for sadza porridge, notably by poor families. Wilson notes that there is a considerable market in soldier termites, and the fried salted termites are relished at beer parties through the late dry season.

**McGregor (1991)** also comments that soldier termites used as a relish for maize meal are considered a food for the poor and the elderly, but as a snack they do not have this association and are widely eaten, especially in beer halls. She remarks that they can be an important source of income, and that "school teachers are as enthusiastic as anyone else about their collection and consumption."

See also Duncan (1933), Jackson (1954), DeFoliart (1989) and Wilson (1989) in the Introduction.

## Lepidoptera

According to **Chavunduka**, caterpillars are harvested mainly by the women who search for them during the appropriate season. If caterpillars that are not yet mature are found, a piece of bark is tied around the tree to establish ownership of the insects. If the host tree is far from her home, she will collect the immature caterpillars and transfer them to a tree nearer her home. Chavunduka states that in good caterpillar areas such as Nuanetsi, Belingwe and parts of Matabeleland, a family can collect as many as four standard six-tin bags of caterpillars a day. They are prepared for the food market and sold at beer halls. "At an average price of \$24.00 per standard six-tin bag, some families can make a fairly good living from selling caterpillars."

For preparation, a caterpillar is held between the fingers of one hand while the other hand is used to forcefully push the head into the body, thus eliminating the ingesta through the anus. According to Chavunduka, an experienced preparer can process up to a bag of caterpillars per day. The caterpillars are washed, then boiled in salt water. For storage they are dried in the sun and can then be stored for three to six months. Chavunduka points out that because of the high content of unsaturated fatty acids, caterpillars, like other insects, cannot be stored longer using the traditional methods of curing.

The vernacular names recorded by **Gelfand** and Chavunduka suggest that 10 or more species of caterpillars are consumed although the specific scientific identity of only three species is known.

According to **Wilson (1990)**, caterpillars were extensively recorded (beginning with the first colonists) as important in the rural diet in Zimbabwe. He cites Bent in 1893 who recorded that the people of Chivi "collect bags of caterpillars, brown hairy caterpillars three inches long, which at this season of the year swarm on the trees. These they disembowel and eat in enormous quantities, and what they cannot eat on the expedition they dry in the sun and take home for future consumption." Caterpillars are important in both clayveld and sandveld ecological zones. Wilson notes, however, that there is "an increasing, but still fairly small, number of people who are starting to refuse to eat caterpillars at all on the grounds that they are for 'primitives'. This is not yet widespread in rural areas, and has not been sufficient to make much of an impact on the urban market." Also, members of Zionist and Apostolic faiths refuse to eat caterpillars, because they consider them "worms" and there is a biblical text forbidding the eating of worms.

Wilson mentions that all lepidopteran larvae are gathered during the rainy season, and most species show irregular cycles of abundance (possible factors responsible for this cycling are discussed). Also, it is stated that most species of caterpillars "have declined considerably in availability in living memory." The decline has not exactly mirrored the decline in food trees, and heavy exploitation by people may be among the factors that have reduced numbers.

**McGregor (1991)** reports that lepidopterous larvae associated with miombo woodland were formerly important as food in Shurugwi, but their availability has decreased markedly under deforestation. Of the 14 ethnospecies reported as commonly consumed in the past, all but one (*baribango*) have decreased in abundance and some are now very rare. *Baribango* feeds on *J. globiflora* and *Bauhinia thonningii* but while the former has decreased as a result of deforestation, the latter invades agricultural and other disturbed land and is still abundant. The main harvest method is to shake the tree so the larvae fall to the ground, or to transfer larvae to a tree closer to home. McGregor reports that she did not see the felling of trees or cutting of branches for caterpillar harvest as described by Wilson. She, like Wilson, mentions the great interannual fluctuation in caterpillar populations.

### Lasiocampidae (egggar moths, lappets)

**Bodenheimer (1951: 190)** states that the Bushmen in certain districts of Zimbabwe collect branches with aggregated larvae of the lasiocampid, *Brachiostegia* sp., which are slightly roasted before being eaten. It seems possible, however, that Bodenheimer may have confused the genus name of the larva with the botanical genus, *Brachystegia*.

### Limacodidae (slug caterpillars)

**Chavunduka** records the term *zviwize* for Limacodidae feeding on *Protea angolensis* and *P. abyssinica* (*munhondo*).

### Notodontidae (prominents)

*Anaphe panda* (Boisdv.), larva

This species is known as *nhowa*, and **Wilson (1990)** gives the food plants on which cocoons are produced as *J. globiflora* and *B. glaucescens*. The food plant given by Gelfand for *nhowa* was *Diplorhynchus condylocarpon*. **McGregor** states that few eat it.

### Saturniidae (giant silkworm moths)

*Bunaea* (= *Bunea*) *alcinoe* (Stoll), larva

*Bunaea* sp., larva

*Cirina forda* (Westwood), larva

*Gonimbrasia belina* Westwood, larva

*Goodia kuntzei* Dewartz (?), larva

*Gynanisa* sp. (?), larva

*Imbrasia epimethea* Drury, larva

*Imbrasia ertli* Rebel, larva

*Lobobunaea* sp., larva

*Microgone* sp. (?), larva

*Pseudobunaea* sp. (?), larva

**Gelfand** states that a number of kinds of caterpillars, especially *Imbrasia epimethea* which is known as *madora*, are eaten as a delicacy and can be bought in any African market. They are eaten only when full-grown. Food plants include the *munhondo* (*Julbernardia globiflora*), *musasa* (*Brachystegia speciformis*), *mupfuti* (*B. boehmii*), *muunze* (*B. glaucescens*), and *mukangadze* (*B. utilis*) trees. According to Gelfand, the larvae live on the bark of the trees during February and March until they are large, at which time they move to the branches and feed on the leaves. By May when they are "large and swollen" they are collected by the women. The tree may be cut down if the larvae are numerous, otherwise they are collected by climbing for them.

The *munhondo* tree also harbors another saturniid larva, the green and spiky *magandari*. They appear at the beginning of the rains and "when it is discovered that they are in the bush, men and women go in small groups to the spot. There may be so many that the tree is covered with them and the women easily fill their baskets. The tree may be cut down so that the caterpillars can be removed from its branches more easily." The intestines are squeezed out, the larvae washed and cooked with a little water. They are then dried and eaten as relish throughout the year. Other caterpillars are prepared similarly.

Other saturniid larvae include the *nowha*, *harati* [*Cirina forda*] and *mashondya*. The *nowha* are found on the *mutowa* tree (*Diplorhynchus condylocarpon*) in the spring. The *harati* also appear in the spring (about October) and are harvested in November. A second generation is harvested in February and a third in May. These larvae are found on the *mukarati* (*Burkea africana*) and *muriranyenze* (*Albizia antunesiana*) trees. After drying, they may be cooked with peanut butter or grilled. According to Gelfand, the *harati*, *nowha* and *madora* are all very valuable and can be traded for millet, bulrush millet and maize when grain is required.

**Chavunduka** records the following Saturniidae: The mopane worm, *Imbrasia epimethea* (Shona: *madora*; Sindebele: *a macimbi*) feeds on *Brachystegia spiciformis* (*musasa*), *B. tamarindoides* (*muunze*) and *Julbernardia globiflora* (*mutondo*) in Mashonaland. In Matabeleland the caterpillars thrive on *Colophospermum mopane* (mopane). *Bunea alcinoe*, known as *mafenje masonja*, feed on *Ekebergia arborea* (*muwuranyimo*) and *Cussonia* sp. (*muufenje*). *Bunaea* sp. (*masinini*) feed on *B. spiciformis* and *J. globiflora* (*mutondo* or *munhondo*). The larvae of *Cirina forda* (*harati*) feed on *Burkea africana* trees. Chavunduka's reference to *I. epimethea* as the 'mopane worm' is probably in error, as, elsewhere, this term is used for *Gonimbrasia belina*.

**Wilson (1990)** added *Imbrasia ertli* to the list of known edible saturniids in Zimbabwe. It is known locally as *avasukundu*, feeds on *J. globiflora* and *Brachystegia glaucescens*, and is now very rare. Also added is a caterpillar known locally as *sindigwizi* which feeds on *J. globiflora* bushes, and which Wilson identifies as *Microgone* spp. or *Goodia kuntzei*. The *magandari* of Gelfand is identified by Wilson as *Lobobunaea* and possibly *Pseudobunaea* and *Gynanisa*. Several other saturniids are discussed including *B. alcinoe* which is said by Wilson to be now virtually extinct in Zimbabwe. *Cirina forda* and possibly *Imbrasia ertli* are among miombo species which show several cycles in some favorable years, so that they are available both mid-rains and at harvest time. *C. forda* is said by Wilson to be still common but to occur fewer times per year. *Gonimbrasia belina*, the 'mopane-worm', is a particularly major food item and is "collected, transported and sold on an industrial basis. At Z\$0.60 per 100 g dry (mid-1986), its price is similar to that of fresh beef."

**McGregor** reports that two saturniids, *C. forda* and *G. belina*, are found in urban and local markets. She, too, mentions that there are several cycles of *C. forda* in years when rains are good.

The April 12, 1988 issue of *The Herald*, a Zimbabwe newspaper published in Harare, reported as follows on *G. belina*:

Bulawayo caterpillars, better known as macimbi or madora, have wriggled their way into the menus of some small city restaurants and the trend appears to be establishing itself in areas where they do not naturally occur. If the wave of popularity of the protein-rich caterpillars is anything to go by, macimbi are likely to become a feature in similar establishments in places as far north as Mutare and Chipinge. In fact, the managing director of a company specialising in dried foods, Mr. Abraham Jassat, is adamant that the caterpillars have always been a popular gourmet [item] even for people in areas where they do not occur.

'Everyone eats them,' said Mr. Jassat whose company has been packaging the caterpillars for the past six years. He showed our correspondent nearly 90 tonnes of the caterpillars which he bought from villagers. 'The season was good for them because of the rains,' he said. Mr. Jassat, who faces stiff competition from small-scale traders, said he was receiving orders from as far off as Mutare, Mt. Darwin, Chinhoye, Harare and Chiredzi. 'In fact we supply the whole country.' The caterpillars occur in large numbers in a belt stretching from Lupane along the Botswana border down to Gwanda. Processing involves squeezing out the roughage and boiling them in salted water before drying them in the sun.

An article in *The Herald* (January 5, 1995) confirms that caterpillar collecting can be more attractive

financially than some other kinds of agricultural endeavor:

Villagers living near the Arda irrigation scheme in Plumtree south are this year shunning cotton picking in favour of a more lucrative venture of harvesting caterpillars (madora) [*Imbrasia epimethea*] for sale. The villagers are selling a 20-litre bucket of caterpillars for \$100 which is a far more viable business than that of cotton which is 35 cents per kilogramme picked. Only 10 people have so far responded to the advertisement for cotton pickers.

Another 1995 article in *The Herald* reported that some villagers in Plumtree have called on the Bulilimamangwe Rural District Council to pass a law prohibiting people from other districts from coming in to collect mopani caterpillars (macimbi) [*Gonimbrasia belina*]. The complaint was that outsiders were causing serious environmental damage when harvesting the caterpillars by burning and cutting down trees. According to the report, hundreds of people from different parts of the country flood rural areas and farms twice a year, some camping for more than three weeks.

In a third article concerning caterpillar happenings near Plumtree, *The Herald* of May 7, 1996 reported that 263 identity documents, comprising identity cards, birth certificates and voters cards were left behind by amacimbi [*G. belina*] harvesters who thronged Bulilimamangwe district in April. Some of the documents were left by people from as far away as Gweru and Mutare districts. Caterpillar collectors who visited the district were this year ordered to pay a \$10 levy and a 20-litre bucket of the caterpillars, to be surrendered after harvesting. They were ordered to surrender their identity documents as security for the 20 litres. Most, however, fled after collecting the caterpillars, preferring to pay \$10 for a new document rather than surrender caterpillars.

See also DeFoliart (1989) and Wilson (1989) in the Introduction.

### Spingidae (sphinx and hawk-moths)

*Agrius* (= *Herse*) *convolvulus* (Linn.), larva

See Wilson (1989) in the Introduction.

### Miscellaneous Lepidoptera

Two other caterpillars mentioned by **Gelfand** are the *nhemeteme*, which lives on the *mupane* tree (*Colophospermum mopane*), and the *njanjenjanje*, which is harvested from the *muzhanje* tree (*Uapaca kirkiania*) in December. See also Duncan (1933) and Jackson (1954) in the Introduction.

### Orthoptera

#### Acrididae (short-horned grasshoppers)

*Acanthacris* (= *Acanthracis*) *ruficornis* (Fabr.)

*Acrida bicolor* (Thunberg)

*Cyathosternum* spp.

*Cyrtacanthacris* (= *Nomadacris*) *septemfasciata* (Serville), nymph, adult

*Locusta migratoides* (author?), adult

*Locusta migratoria* (Linn.), adult

*Ornithacris cyanea* (Stoll), adult

*Truxaloides constrictus* (Schaum)

By far the most important species of locust is *Locusta migratoria*, known as *mhashu*, but five other species are also consumed (**Gelfand 1971**). Because of their seasonal appearance, and at infrequent intervals in a locality, they are regarded more as a delicacy than as a food. When a swarm of *L. migratoria* has descended, usually in cold weather, they are collected from the trees and bushes early in the morning while they are still inactive. They are carried back to the village in large bags or baskets and poured into a pot of boiling water. When cooked they are spread out to dry for a day or two, then stored in bags until needed. They are used as a relish with the porridge. To prepare them, the housewife places them in a piece of burnt claypot with water and a little salt, then stirs and turns them until the water has boiled away and they are completely dry. Another method of preparing them is to roast and eat them after adding a little water and salt. Gelfand states that the legs are not discarded but are removed and ground to a fine powder which is cooked with salt and peanut butter, the mixture being eaten as a relish.

*Nomadacris septemfasciata*, the red locust (*huigo*) is much smaller than *L. migratoria*. They fly in swarms in the summer and are caught and prepared in the same way as *L. migratoria*. *Ornithacris cyanea*

(*bandamukuta*) flies throughout the year but they are not abundant. About 20 may be collected in a day. They are roasted with a little water and salt. Two other kinds of Acrididae eaten by the Shona are *Truxaloides constrictus* (known as *tsunwarunwa*) and *Cyathosternum* spp. (*hwenjekwenje*).

**Chavunduka (1975)** notes that before the international locust control programs came into existence, the locusts came in swarms and ate everything -- but they got eaten as well. During each invasion tons of locusts were collected. Species used as food include *Nomadacris septemfasciata*, the red locust, and *Locusta migratoides*, both of which are known as *mhashu*. The former, according to Chavunduka, was responsible for a recent invasion into northeastern Zimbabwe. Two other species of acridids eaten by the Shona are *Acanthracis ruficornis* (*mhashumapfunde*) and *Acrida bicolor* (*mutsumwarumwa*). According to Chavunduka, cattle are "very fond" of locusts. They have been observed eating them in Matabeleland and Botswana during winter.

**Wilson (1990)** mentions *O. cyanea* (local name *bambamukota*) as still common, *N. septemfasciata* (local name *njeru*) as rare, and *T. constrictus* (local name *shumwashumwa*) as common. There are differences in some of the local names applied by Wilson from those by earlier authors. Wilson mentions six additional acridids: a medium-sized red migratory locust (local name *bandairo*); large winged grasshopper (*boromoro*); large, wingless brown grasshopper (*bupu*); small gray grasshopper (*chindanga*); migratory locust (*chinjike*) and a solitary locust (*mhashu mapfunde*). Most grasshoppers and locusts occur and are harvested during the rains, but *O. cyanea* is found all year. Wilson, as did Chavunduka earlier, points out that governmental control of migratory locust species, while relieving the country of a serious menace also deprived the people of a major source of food. See also Duncan (1933), Jackson (1954), DeFoliart (1989) and Wilson (1989) in the Introduction.

### Gryllidae (crickets)

*Acheta* sp.

*Brachytrupes* (= *Brachytrypes*) *membranaceus* Drury, adult

The sand cricket, *Brachytrupes membranaceus* is considered a delicacy according to **Gelfand**. It is known as *gurwe* and appears during the rainy season. Its presence is indicated by a small heap of soil pushed out from its burrow, and a hoe is used to uncover the crickets. As many as 100 can be collected in a day. They are usually collected by the women and children. For preparation, the wings and forelegs are removed but the hind legs are kept. The crickets are degutted by opening the abdomen. They are grilled with a pinch of salt added and are eaten as relish with stiff porridge.

The most sought for cricket is *Brachytrupes membranaceus*, the sand cricket or *gurwe*, according to **Chavunduka** who states, "When well prepared it is considered a delicacy, for it turns an ordinary meal into a dinner." The black cricket, *Acheta* sp. (*chikudyu*), is also consumed by the Shona.

**Jackson (1954)** states, "As a point of interest, especially to gardeners, I might mention that the crickets [*B. membranaceus*] are got from their holes in the ground by, in addition to digging, pushing down a stinging ant on the end of a piece of grass. On receiving the sting from the writhing ant, the cricket usually jumps from its tunnel and is captured." **Wilson (1990)** mentions *B. membranaceus* and two species of black crickets which have different vegetation associations. *B. membranaceus* is one of the species that has increased in numbers because it is particularly suited to the new kinds of agro-ecosystems. It is now a significant pest in sand-soil fields. It inhabits grassy woodland and particularly maize fields according to **McGregor**; it is increasingly abundant and is sold in urban markets. See also Wilson (1989) in the Introduction.

### Gryllotalpidae (mole crickets)

*Gryllotalpa* (= *Curtillia*) *africana* (author?)

**Gelfand** mentions that the mole cricket, *Curtillia africana*, known as *ndororo*, is used in the Nuanetsi area. This species is also mentioned as food by **Chavunduka** and by **Wilson (1990)**.

### Tettigoniidae (long-horned grasshoppers)

*Ruspolia* (= *Homorocoryphus*) *differens* (= *nitidulus*) (author?)

One species of tettigoniid, *Homorocoryphus nitidulus* (*tsumwa*), is collected and cooked in the same way as the *mhashu* (**Gelfand 1971**). *R. nitidulus* is known as *dendamafuta* or *madumbudya* according to **Chavunduka (1975)** and as *dhuabudya* according to **Wilson (1990)**. It occurs in swarms in grassy woodland fields, particularly millet, according to **McGregor**. It is harvested during the mid rains and is sold in urban markets. See also DeFoliart (1989) and Wilson (1989) in the Introduction.

The April 22 issue of *The Herald* (newspaper published in Harare) reported as follows:

Meat will be abundant in Dzivaresekwa during the forthcoming independence celebrations --

thanks to the grasshoppers [tettigoniids] which swarmed the area yesterday. Residents in the high-density suburb had been worried by the shortage of meat in butcheries because of the increased demand for meat throughout the country. They were relieved early yesterday when they awoke and found that grasshoppers had raided the suburb in their thousands. Housewives abandoned their domestic chores to fetch buckets, bottles and tins to fill them with the delicious insects. The grasshoppers started swarming by 7 am and were still being collected by late afternoon yesterday. By nightfall the swarms had spread over most of Harare including the city centre.

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