

**Chapter 6****SOUTH AMERICA: BRAZIL****Taxonomic Inventory**

Taxa and life stages consumed

**Coleoptera****Bruchidae (seed beetles)**

Bruchid sp., larva

**Cerambycidae (long-horned beetles)***Macrodonia cervicornis* Linn., larva**Curculionidae (weevils, snout beetles)***Rhynchophorus* (= *Calandra*) *palmarum* Linn., larva**Scarabaeidae (scarab beetles)***Megasoma anubis* Chevrolat (= *hector* Gory), larva**Miscellaneous Coleoptera**

Scientific name(s) unreported

**Diptera****Simuliidae (black flies)***Simulium rubrithorax* Lutz, larva**Homoptera****Membracidae (treehoppers)***Umbonia spinosa* (Fabricius), adult**Hymenoptera****Apidae (honey bees, bumblebees)***Oxytrigona* spp. (3), larvae, pupae*Oxytrigona tataira* (author?), larva, pupa*Scaptotrigona nigrohirta* Moure Ms., larva, pupa*Tetragonisca angustula angustula* Latreille (= *Frieseomyllitta* sp. of Posey 1983b,c), larva*Trigona chanchamayoensis* Schwarz, larva, pupa*Trigona spinnipes* (Fabr.), larva, pupa**Formicidae (ants)***Atta* (= *Oecodoma*) *cephalotes* Linn., winged adult*Atta* (= *Oecodoma*) *sexdens* Linn., winged adult**Vespidae (wasps, hornets)***Brachygastra* (= *Nectarina*) spp., larvae, pupae**Isoptera****Termitidae (termites)***Cornitermes* sp., winged adult, soldier, queen*Termes flavicolle* Perty, soldier**Miscellaneous Isoptera**

Scientific name(s) unreported

**Lepidoptera****Hepialidae (ghost moths and swifts)**

Hepialid sp., larva

## Miscellaneous Lepidoptera

Scientific name(s) unreported

## Orthoptera

### Acrididae (short-horned grasshoppers)

Acridid sp., adult

Several studies provide insight as to the comparative role of insects as food among indigenous populations in Brazil. **Lizot (1977)** argues that it has been wrongly supposed, without taking into account regional variations, that game resources and protein supplies are limited in the Amazonian forests. He suggests from a study of two local groups of Yanomami, the Karohi and the Kakashiwë, that food requirements are satisfied by a very moderate amount of work and that variations in the level of consumption depend more on attitudes toward work than on the supply of game. Although the diets of both groups contain plenty of calories and protein, the Kakashiwë consume less game and fish because the men, according to Lizot, spend less time hunting and fishing (Brazil Table 1; Lizot's Table 6, p. 509). Shown also by the tabular data is that several kinds of insects, i.e., caterpillars, palm worms, termites, and bee and wasp brood are included among the animal foods of the Yanomami. Significant differences in the kinds of animal foods consumed by the men and the women are also apparent. The women include a greater variety of insects in their diet than do the men.

**Posey (1978)** cites several more recent Brazilian studies and suggests that supposedly low protein intake by many Amerind groups reflects "erroneous data collection by biased observers." Noting that gathered foods, including insects, are often eaten on the spot and that the gathering activities of Indians are so routine and continuous that data are difficult to acquire, Posey states, "Unless researchers follow on such routine ventures, constantly recording and weighing the gathered foods, the importance of such foods may be grossly underestimated."

**Milton (1984)** concludes from a study of the Maku in northwestern Brazil that calories may at times pose a dietary problem. The Maku are seminomadic hunter-gatherers who cultivate bitter manioc on a small scale and live in the upland rainforest well away from major rivers. They benefit from exchanges of protein foods and labor for carbohydrate foods and other items from the more sedentary Tukanoans who are riparian fisher-gardeners. Milton discusses in detail the protein and energy sources of the Maku. Milton's data were gathered during the latter part of the rainy season, June 24 to October 15, which is the annual low point in wild food availability. The two strongly discernible seasons include a long rainy period from March until September (more than 200 mm per month) and a drier period from October through February (less than 200 mm per month). Milton states (p. 14):

Insects made a valuable contribution to the Maku diet. Four insects were used as food during the total sample, two larval forms (grubs), one species of caterpillar, and termite soldiers. Analysis of this material shows that all four species are high in protein and two also contain considerable fat [results of analyses are not given, however]. These insect foods may be particularly welcome to Maku between July and September, since data indicate that this is the time of year when game animals are hardest to hunt and theoretically should be most lean.

Brazil Table 2 (Milton Appendix, pp. 25-27) shows that some insects are collected even when fish and game are plentiful. It can be noted also that the fresh weight of the insects that were collected exceeded that of both birds and reptiles.

**Posey (1987a)** briefly discusses the cultural and ecological implications of insects as food. **Posey (1987b)** summarizes the uses of insects by the indigenous peoples of Brazil not only as food, but their medicinal uses and their place in mythology and folklore, in ritual and ceremony, and in agriculture. Some examples of the latter, cited by Posey from his previous work, are described as follows: "For the Kayapó, termite mounds furnish soil to enrich plantations, as well as to form part of a mixture with ant nests to actually create planting zones in the savanna. . . . Ant nests of *Azteca* are buried with some newly planted crops to increase growth of the plant; the results are said by the Kayapó to be phenomenal. . . ." Posey mentions that stingless bees (Meliponinae) are kept by the Kayapó simply because they are fascinated by insect behavior.

Posey concludes his ethnoentomological summary with a moving description of the aesthetics of insects in Brazilian life (p. 199):

Nothing is more thrilling or beautiful than the flight of *Morpho* butterflies, filling the dark trails of tropical forests with scintillating blue flashes from their iridescent wings. Likewise there is no

more beautiful natural spectacle than that of the 'sulphurs' butterflies that fill the tropical skies and river beaches during the summer months. To the Kayapó Indians, at least, nothing typifies more their land than these scenes. I have sat for many pleasant hours with the Kayapó watching the kilometers-long strings of were-ngrangra (Pieridae: *Phoebis*) and their ribbons of color as they hover, drink and flutter on the sandy beaches and river banks. I have spent just as many hours watching the Indians watching the butterflies. They are keen observers of nature and fascinated in all that composes their natural world. This brief essay is but tribute to indigenous knowledge of nature and their respect for life in its many forms. Ethnoentomology is not only the study of indigenous 'folk' science, but also the relationship between humans and nature. It is sad, but necessary, to end on a negative note: both, Indians and nature, are in peril in the Amazon. Indigenous knowledge of nature, and nature herself, are disappearing at alarming rates. As scientists we must work not only to record Indian knowledge, but also to protect the very lands and people who encompass millenia of accumulated information and experience in co-existing with nature.

The Desâna Indians of the Tiquié River (a tributary of the Uaupès and ultimately of the Rio Negro and the Amazon) include insects in their economic calendar; **Ribeiro and Kenhiri (1989)** discuss the relationship between subsistence activities and the seasonal appearance of given constellations. The Desâna classify their regional climate into certain dry seasons interspersed with rainy seasons corresponding to the appearance of specific constellations in the sky. Natural economic cycles correspond to these rainy seasons and constellations, such as the beginning, maximum ripening, and end of certain fruit harvests; spawning seasons and upstream migration of given fish species; and the gathering of nutritionally important insects such as leafcutter ants, flying termites and others which are discussed below under the appropriate taxonomic categories.

### Coleoptera

A number of beetle species have been reported as food in Brazil, but the specific identity of most of them is unknown.

#### Bruchidae (seed beetles)

According to **Chagnon (1968: 30-32)**, the discarded seeds of palm fruits become infested with grubs that are much smaller than palm weevil larvae, and which the Yanomamo (Venezuela-Brazil) extract and prepare in the same manner as the larger grubs which they use (see under Curculionidae). It may be that these are a species of bruchid as reported in Colombia by Ruddle.

#### Cerambycidae (long-horned beetles)

*Macrodonia cervicornis* Linn., larva

**Netolitzky (1920; vide Bodenheimer 1951: 306)** reported that the grubs of *M. cervicornis*, which grow in the stems of *Bombax* trees, are roasted over burning coals in Brazil.

#### Curculionidae (weevils, snout beetles)

*Rhynchophorus* (= *Calandra*) *palmarum* Linn., larva

There are several reports that obviously refer to palm weevils of the genus *Rhynchophorus* in Brazil, although only one indicates the generic identity of the insect. The earliest report known to the author that probably refers to *Rhynchophorus* is that of **Southey (1810, I: 109-110)** who, in his History of Brazil, describes an expedition in 1542 in part as follows:

A winding river [the Orinoco?], whose banks were beautifully clothed with cypress and cedar, gave them much trouble in crossing and recrossing it for four days. The potatoes in this country were of three sorts, white, yellow, and red, all large and excellent; there was also plenty of honey. With the new year they entered again upon a desert, and for the first time were in want of food. They found however a good resource in what European prejudice would have at another time rejected. A large white grub, about the size of a man's little finger, is bred between the joints of a certain species of cane.; these grubs are fat enough to be fried in their own grease; the Indians eat them, and the Spaniards being now forced to make the proof, admitted that they were savoury.

**Wallace (1853)** discussed the larva of a beetle which he believed to be probably a species of *Calandra* as it is found in the stems of palm trees: "It is much swollen, and attenuated at each end; and is a rich fatty mass, which is eaten slightly roasted or fried. It is not by any means so common in the Amazon as the other edible insects; and in fact, I never saw it eaten, or ate it myself but once. It is called '*muxciwa*' by the Indians."

**Spruce (1908, I: 483)** reports that: "Indians of the Rio Negro, Uaupes, Casiquiari, Orinoco (and perhaps of the Amazon) eat the large grubs bred on various growing palm stems, but especially in Pihiguas. They are said to be of the size of the forefinger, and the mode of eating them is this. By a sudden twist of the head, it is pulled away along with the intestinal canal, and the animal is then roasted on the budari or mandiocca oven."

**Bodenheimer (1951: 310)** cited T. Koch-Grunberg (1921) who spent two years with the Indians of northwest Brazil and reported that: "On the Yapura thick white grubs of beetles from palm stems were consumed as delicacies raw and alive."

**Chagnon (1968: 30-32)**, saying that several varieties of insects are collected by the Yanomamö, states:

Perhaps the most desirable food in this category is the grub of an insect that lays its eggs in the decaying pith of dead palm trees. The Yanomamö come very close to practicing 'animal domestication' in their techniques of exploiting this food. They deliberately cut the palm tree down in order to provide fodder for the insect. When they cut the tree, they also eat the heart of the palm, a very delicious, crunchy vegetable that slightly resembles the taste of celery hearts. One palm we cut yielded an edible heart of about 50 pounds. After the pith has been allowed to decay for several months, it contains numerous large, fat, white grubs. The pith is dug out of the tree with sticks, broken open by hand, and the grubs extracted. Each grub is bitten behind his squirming head, and the head and intestines removed simply by pulling the body away from the teeth. If a grub gets damaged in the process of extracting it, the parts are eaten raw on the spot. A fair-sized palm tree will yield three or four pounds of grubs, some of them as large as a mouse. The grubs are wrapped in small packages of leaves and placed in the hot coals to roast. They render down in the heat, yielding some liquid fat, which is licked off the leaves, and a soft, white body. I could never bring myself around to eat one, but an experienced missionary told me they tasted very much like bacon. . . .

See also Lizot (1977, curculionids as food of the Yanomami), in the Introduction, Métraux (1963, as food of the Cocama and Omagua of the upper Amazon), and Steward & Metraux (1963, as food of the Yameo and the Yagua) under References Cited.

### Scarabaeidae (scarab beetles)

*Megasoma anubis* Chevrolat (= *hector* Gory), larva

**Netolitzky (1920;** vide Bodenheimer 1951: 308) (awaiting re-translation) reported that the grubs of *Megasoma hector* are roasted over burning coals in Brazil. **Bodenheimer** (p. 310) again cites Koch-Grunberg (1921): "In Yauarte the women brought us four containers and one bag full of cockchafers, which now abounded and covered the water to the great delight of the *aracu*-fish. These beetles are very fat. The Indians eat them roasted, and as I found out myself, they have a rather good taste."

### Miscellaneous Coleoptera

**Bodenheimer (1951: 309-310)** cites Koch-Grunberg (1909) who mentioned that: "In Pinokoalisa the women answered our request for food with the words: 'No chicken, no pineapples, no bananas! But beetles and ants!'"

Beetle larvae which are found in burity palms are grilled and eaten by the Tukuna (**Nimuendagú 1952: 32-33**). Coleopterous larvae are consumed by the Desâna (**Ribeiro and Kenhiri 1989**). See also Milton (1984) in the Introduction and Goldman (1963, food of tribes in northwestern Brazil) under References Cited.

## Diptera

### Simuliidae (black flies)

*Simulim rubrithorax* Lutz, larva

**Shelley and Luna Dias (1989)** observed *Simulium rubrithorax* larvae being consumed by Yanomami Indians temporarily living at Surucucus. The larvae are large (>1 cm long) and so abundant in cascades where they occur that the rocks appear black. The women make regular forays to the waterfalls where the larvae occur,

where they scrape them from the rocks by hand and store them in banana leaf pouches. The larvae are later partially baked in these pouches over a fire before being "enthusiastically consumed." The Indians say the larvae taste similar to freshwater prawns. The authors note that, as *S. rubrithorax* adults are zoophilic in their bloodfeeding habits, the use of their larvae by the Yanomami has no effect on the transmission dynamics of the filarial nematode, *Onchocerca volvulus*, the etiological agent of human onchocerciasis.

## Homoptera

### Membracidae (treehoppers)

*Umbonia spinosa* (Fabricius), adult

One of the insects discussed by **Wallace (1853)** is *Umbonia spinosa* which (p. 243):

... swarms at certain seasons on the Inga trees, which are universally planted by the Indians near their cottages for the sake of the fruit, which is much esteemed by them. The insects fall upon the ground in great numbers, and the sharp spine on their thorax renders walking barefoot very disagreeable. This spine seems to render them very ill adapted for feed, but when they first appear the whole body is soft and flaccid, and they are then collected and roasted in a flat earthen pan. They are not, however, so much esteemed as the other insects I have mentioned.

## Hymenoptera

### Apidae (honey bees, bumblebees)

*Oxytrigona* spp. (3), larvae, pupae

*Oxytrigona tataira* (author?), larva, pupa

*Scaptotrigona nigrohirta* Moure Ms., larva, pupa

*Tetragonisca angustula angustula* (Latreille)(= *Frieseomylitta* sp. of Posey 1983b,c), larva

*Trigona chanchamayoensis* Schwarz, larva, pupa

*Trigona spinnipes* (Fabr.), larva, pupa

Mention of the use of honey was made by **Southey (1810)**. **Bodenheimer (1951: 310)** cites Koch-Grunberg (1921) as reporting that although domestic animals are rare among the Makunas, he observed a piece of hollow tree-trunk, a bee-hive, hung on the pole of the huts at a height of about two meters.

According to **Chagnon (1968)**, nothing excites the Yanomamö more than finding a dead tree in which bees have built a nest. Everything is halted until the tree is cut down and the honey exposed. Chagnon observed as follows: "When it was exposed, they gleefully tore the combs out, dunked them into the amber liquid, and gorged themselves on the larvae-filled combs."

**Posey (1983a; vide Posey 1987b: 193-194)** reported on beekeeping and the great importance of honey and other bee products for the Kayapó in the State of Para. **Posey (1983b,c)** found that the Kayapó recognize 56 species of bees, mainly on the basis of ecological niche and behavioral characteristics. The Kayapó name, scientific name, information on the products used, season of honey harvest, and aggressiveness are given by Posey for 28 of the principal species, mostly Meliponinae, used by the Kayapó. Nine species, including *Apis mellifera* and eight species of the Meliponinae are semi-domesticated or to some extent manipulated. The larvae and pupae of seven species are used as food. These are *Frieseomylitta* sp. (see *Tetragonisca a. angustula* above), known as *mykrwat* by the Kayapó; *Oxytrigona tataira*, known as *kangarakra-kamrek*, and three additional species of *Oxytrigona* known respectively as *kangara-kra-tyk*, *kangara-udja-ti* and *kangarati*; *Trigona chanchamayoensis* and *T. spinnipes*, known as *imreti-re* and *mehnykamrek*, respectively.

**Posey and Camargo (1985)** provide biological information on a number of the species of stingless bees (Meliponinae) used by the Kayapó, including two species used as food. The combs with larvae of *Scaptotrigona nigrohirta* (Kayapó term: *imre-nhy-kamrek*) are said by the Kayapó to taste like cookies. Larvae of *Tetragonisca a. angustula* (*my-krwat*) are also eaten (*T. a. angustula* = *Frieseomylitta* sp. of Posey 1983c).

According to Nogueira-Neto (1970), who is cited by **Posey (1987b: 193)**, the scientific names of many species of Meliponinae are taken from Tupi folk taxonomy.

See also Lizot (1977, foods of the Yanomami) in the Introduction, Métraux (1963, foods of the Cocama and Omagua of the upper Amazon) and Steward & Métraux (1963, foods of the Yameo) under References Cited.

### Formicidae (ants)

*Atta* (= *Oecodoma*) *cephalotes* Linn., winged adult

*Atta* (= *Oecodoma*) *sexdens* Linn., winged adult

Winged adults, especially females, of the leafcutter ants, genus *Atta*, have been widely used as a favored food in Brazil, both in the urban centers and in the countryside. There is a variety of vernacular names, but only two species have been reported by their scientific names, *A. cephalotes* and *A. sexdens*, which are undoubtedly the most commonly consumed. The *tama-ioura* mentioned by **Piso (1658: 9, 29)** was, according to Bodenheimer (p. 305), the leafcutter ant, *Atta cephalotes*.

**Wallace (1853)** gave an informative and graphic account of the use of *Atta* (= *Oecodoma*) *cephalotes*, the "great-headed red ant" pp. 242-243):

. . . It frequents sandy districts and places where 'red earth' is found, but is absent from the 'black earth' or the rich alluvial soil of the Amazon. It forms its nests in the woods and in gardens, turning up the soil in such large heaps as to make one doubt whether so small an insect could have been the workman. I have seen elevations of this kind twenty feet square and a yard high, containing many tons of earth. These hillocks are riddled with holes in every direction, and into them the ants may be seen dragging little circular pieces of leaf, which they cut off from particular trees which they prefer; orange trees and leguminous shrubs suffer most from their ravages, and these they will sometimes entirely strip of their leaves in a night or two. Young plants too of every kind suffer very much, and cannot be grown in many places on account of them. They remain in one locality a long time; for on my observing to a gentleman at a cattle estate near Para how remarkably the track of these ants was worn down across a pathway and through grass, he informed me that he had observed them marching along that very track for fifteen or twenty years. The insects that do this are of course the neuters, which have tremendous jaws. They often swarm in houses at night, crawling over the supper table and carrying away fragments of bread and farina. . . . It is the female of this destructive creature that furnishes the Indian with a luxurious repast. At a certain season the insects come out of their holes in such numbers, that they are caught by basketsfull. When this takes place in the neighbourhood of an Indian village all is stir and excitement; the young men, women and children go out to catch *saïbas* with baskets and calabashes, which they soon fill; for though the female ants have wings, they are very sluggish and seldom or never fly. The part eaten is the abdomen, which is very rich and fatty from the mass of undeveloped eggs. They are eaten alive; the insect being held by the head as we hold a strawberry by its stalk, and the abdomen being bitten off, the body, wings and legs are thrown down on the floor, where they continue to crawl along apparently unaware of the loss of their posterior extremities. They are kept in calabashes or bottle-shaped baskets, the mouths of which are stopped up with a few leaves, and it is rather a singular sight to see for the first time an Indian taking his breakfast in the *saïba* season. He opens the basket, and as the great-winged ants crawl slowly out, he picks them up carefully and transfers them with alternate handfuls of farina to his mouth. When great quantities are caught, they are slightly roasted or smoked, with a little salt sprinkled among them, and are then generally much liked by Europeans.

**Bates (1863;** vide Cutright 1943: 311) reported that Indians on the Tapajós River made a sauce from the cassava plant, called *tucupi*, which they seasoned with sauba ants. According to **Cowan (1865: 160)**, "Piso speaks of yellow Ants called *Cupia* inhabiting Brazil, the abdomen of which many used for food, as well as a large species under the name of *Tama-joura*." **Orton (1870: 300-301)** described the leafcutter ants as follows:

. . . But the most prominent, by their immense numbers, are the dreaded *saïbas*. Well-beaten paths branch off in every direction through the forest, on which broad columns may be seen marching to and fro, each bearing vertically a circular piece of leaf. Unfortunately they prefer cultivated trees, especially the coffee and orange. They are also given to plundering provisions; in a single night they will carry off bushels of farina. . . . The light-colored mounds often met in the forest, sometimes measuring forty feet in diameter by two feet in height, are the domes which overlie the entrances to the vast subterranean galleries of the *saïba* ants. These ants are eaten by the Rio Negro Indians, and esteemed a luxury; while the Tapejos tribes use them to season their mandioca sauce.

**Wallace (1889: 201)** travelled up the Uaupes River in 1851 and mentions that: "The large *saïbas* and white ants are an occasional luxury, and when nothing else is to be had in the wet season they eat large earth-worms, which, when the lands in which they live are flooded, ascend trees, and take up their abode in the hollow leaves of a species of *Tillandsia*, where they are often found accumulated by thousands. Nor is it only hunger that makes them eat these worms, for they sometimes boil them with their fish to give it an extra relish."

**Rolfs (1923)** discusses the great agricultural destructiveness of the sauva (*Atta sexdens* (Linn.) in tropical America, calling it the "billion dollar insect." The formicaries are often six to eight meters across and the ants range as much as 100 meters from the nest. They often connect their formicaries with the field in which they are working by long tunnels, and Rolfs states that one formicary that he studied went to a depth of more than four meters. Formicaries of this size produce thousands of tanajuras (queens) each spring (October and November) after the beginning of the rains. The nuptial flights of the queens are short and most alight to begin new colonies within 100 meters of their birthplace. Each queen carries with her enough "ambrosia" to care for herself and progeny until the first workers are ready to bring in the organic matter on which to plant the mushrooms.

The tanajuras are large, with a wing-span of 6 to 7 cm. Rolfs states (p. 27):

Just after they have shed their wings the tanajuras are considered a particularly appetizing morsel. We had been told repeatedly that the aborigines ate them, and that some of the country people cooked them. So we made particular inquiry to find out how this particular feat was accomplished. It seems that the regulation way is to pull off the heads and fry the abdomen in hot fat. . . . While in the hot fat, the abdomens burst, sounding and appearing very much like popcorn. In eating quality, too, they are about like good popcorn, crush readily and give off a rather pleasing, evanescent aroma.

A teacher in the local missionary school at Juiz de Fora told Rolfs that she had frequently seen the native children in school "pull off the heads and wings and eat the remainder with a great deal of gusto." Rolfs avers that there is no reason why one should have an aversion to eating tanajuras as they eat nothing but mushrooms and their formicaries are absolutely clean. They are more cleanly and "certainly more appetizing in appearance than either oysters or shrimp . . ."

**McGovern's** account (1927; vide Cutright 1943: 312) of joining an ant-hunting expedition on the headwaters of the Uaupes River, not far from the boundary with Colombia, was described as follows by Cutright:

. . . A low buzzing note was coming from the nests, and McGovern realized that they had arrived just in time for the swarming of these insects. He was perplexed as to how the Indians had gauged their arrival so accurately, for almost at once thousands of the queens and drones began to take wing. The natives turned the baskets upside down over the various exits, and the ants flew into them and were caught. All of the baskets were quickly filled, and the ant hunting expedition returned to camp jubilant.

The account continues:

The ants were not very large, but some ninety to a hundred of them made a very satisfactory meal, according to McGovern. The Indians ate some of them raw, and others they roasted. Of the raw ants they ate only the heads. However, the whole bodies were eaten if they were roasted. The Indians had large earthenware pans in which they roasted the insects over the fire. McGovern, a true scientific spirit ever eager for new experiences, tried the ants both cooked and raw. He found the uncooked heads too oily, but the roasted ants tasted to him like crisp bacon; and he could not understand why anyone should object to eating them. These Indians considered ants a great delicacy.

**Noice (1939: 120-121)**, who journeyed to Yawarete on the upper Rio Negro River in northwestern Brazil in order to photographically record the daily life of the Tarianos, admonishes that, regarding food, the tropical adventurer "had better make up his mind to leave his fussiness at home; for nothing can make him seem more coldly superior, remote and unfriendly to the Indians than to sit apart at mealtime, opening strange tins of foreign foods, and scorning the hospitable offering of what are considered delicacies in the jungle." Noice says:

As an instance, imagine sitting down to an entree of Sauba ants - a wriggling mass of the leafcutting jungle species, which are purely vegetarian in their habits. But they weren't so bad, and I found them quite palatable - after I had learned to roll my tongue back out of the way of their nippers and bite off the meaty belly with my front teeth. . . . The Tarianos captured the Saubas at swarming time and brought them back to the moloka in wicker cages. There, cages and all, the ants were placed on a platform over the fire to be smoked. After that, they were made brown and crisp in a pottery dish, and this way they are really delicious, the flavor being similar to mildly-cured bacon.

**Bodenheimer (1951: 309-310)** cited T. Koch-Grünberg (1909) who spent two years with the Indians of northwest Brazil and reported that:

One evening an Indian ran into the house calling: 'The saüba-ants are swarming.' This event had been expected for some days. Early before sunrise all inhabitants departed for the ant-hunt. A low scaffold was erected over the nest, on which the Indians posted themselves, in order to avoid the bites of the ants. They burned the wings of the swarming sexuals with torches and then gathered them as speedily as possible into baskets and leaf bags. During the following days we had for lunch highly flavoured sandwiches: *biju* with finely pounded ants, which were roasted and seasoned with pepper and salt and which we enjoyed very much.

Koch-Grünberg continues (I: 141-142):

[One] Indian delicacy, which also tastes not bad to our European palate is the large winged ant, roasted on the hearth and tasting like fine Christmas cookies. The head and remnants of the wings are detached and the fat abdomen only is eaten. Gourmets even consumed them alive. The swarming season of these ants, early in the rainy period, is a period of festival for the entire village. At the first announcement of their swarming, everybody, old and young, joyously collects baskets and jars and runs to the ants' nests to gather as many as possible of this appreciated delicacy.

And finally (I: 332-334), Koch-Grünberg says: "After the rich food of the Tukano and Tuyuka, we now had to manage with mandioca in abundance from the *Inga*-shrubs. . . . Still in darkness, we roused one another, in order not to lose our first breakfast, the only substantial meal of the day, consisting of a soup of *biju* and roasted ants."

Bodenheimer (p. 306) cited F. de Azara (1809) who described how the inhabitants of Santa Fe go hunting for the winged ants; the fat abdomens are eaten raw, or they are fried, passed through syrup and eaten as sweets. Also cited (p. 306) is Gallendo (1916) who notes that the practice of eating the abdomens of *Atta sexdens*, the *tanajura*, survives in Brazil. A number of early references to ants (J. de Laet 1630 and G. Marcgraf 1648 among them) may in part actually refer to termites, according to Bodenheimer (pp. 305-306).

The winged females of *saüva* ants or *icá* (*A. cephalotes*) are eaten by the Tukuna (**Nimuendajú 1952: 32**).

**Lenko and Papavaro (1979: 276-282)** cite many references, both old and recent, concerning the "ica" ant as a traditional treat in Brazil, especially in Sao Paulo and the surrounding region. Some people also believed that the ants were of therapeutic value. The authors mention (p. 278) a report by General Couto de Megalhaes regarding his trip to the "Araguaia," and saying that in the middle of the last century, in Sao Paulo, the best families ate "ica" ants . . . . "these ants were sold in trays on the streets. Later on these families didn't want to acknowledge that they ate ants . . . ." Lenko and Papavaro cite a number of other earlier authors as follows:

(page 276) Gabriel Soares de Souza (1587) who provided probably the first reference to *Atta* ants, or to insects, as food in Brazil: "They raise ants on the same soil, called 'icas' by the Indians. . . . They eat these ants roasted over the fire; some white, and mixed-bloods, say that they are a good meal and that they are delicious. . . ."

(page 276) Padre Ancieta: "Indians gather to see the ants come out of their tunnels happily jumping to get the ants to eat: They fill their bowls, return home, and roast them in clay pots to eat. This way they can be kept many days without spoiling. This food is delicious and healthy, I know because I ate it."

(page 276) Yves d'Evreux (1615) described the catching of ica ants (translation): "the indians only got the ants which were as thick as a finger. The whole tribe participates in this ceremony. The first time I saw it I didn't know why the indians were in a hurry, leaving their huts to chase flying ants. They pick up the ants, put them in a covered basket, removing their wings to roast them and eat. . . ."

(pp. 280-281) *Atta* ants have also been a common food item in the urban areas. According to Sampaio (1894) (translation), people run to catch this flying delicacy:

several people have bowls with water to hunt ants. The 'ica' hunters are on the streets and in the city parks where there are fewer ants, but they don't take chances of getting bitten. The place to hunt is in the center of the ant mound, where they can catch 12 to 20 liters of ica ants, when the queens come out, but the person gets badly bitten. Some young men jumped around to catch them, but ended up with their legs badly bitten and bloody.

Sampaio notes that the ants move in a disorderly manner. Swarming occurs annually between October and December and requires thunder without rain. Sampaio mentions that, "Icà ants go to the markets. It was cheap in the old times, now it is much more expensive."

(pages 279-280) According to St. Hilaire (1936):

The entire population of Espirito Santo is not bothered by the abundance of the big ants. As they fly in, the blacks and the children take them to eat. The rival people from Campos call them 'tanajura-eaters.' This doesn't happen only in Espirito Santo, but also I heard that they are sold in the market in Sao Paulo, roasted, without their abdomens. I ate a dish prepared by a woman from Sao Paulo and didn't think it was unpleasant.

(page 279) According to G. Amado (1954), people from Sao Paulo really enjoyed ica ants: "Many students had them in their pockets to eat during class, with roasted seeds of the jaca fruit. Others ate 'tanajura' ants, also roasted. I saw them eating them often, the ant meat is like 'cambuca' fruit, whitish and sticky. I didn't try it because I was afraid."

(page 279) According to Penteado (1962), Sao Paulo was invaded by ica ants (1902-1912) which were eaten roasted with flour by many important people. The older people from Sao Paulo were called "ica eaters."

**Posey (1987b):** 193-194) cited A. Giacone (1949) who reported the eating of saúva ants by the Tucano, and J.C.M. Carvalho (1951) who reported that the heads of some soldier and worker ants are also eaten.

Professor Robert L. Jeanne, University of Wisconsin Department of Entomology, related as follows his first gastronomic encounter with leafcutter ants, which occurred in 1969 at a fazenda about 40 km east of the city of Santarem, Para (pers. comm. 1987):

In January, early in the wet season, the local species of *Atta* (leaf-cutter ants) produced reproductives. Large numbers of alates - reproductive males and females - boiled out of the nests in the area and took wing. The event lasted only about a day. While it was happening, one of the local natives told me that people of the region consider the queens a delicacy, and offered to show me how they eat them. We collected the clumsy virgin queens from the nest mounds and threw them into a pail with a little water (to keep them from climbing out). Having collected a couple dozen, we returned to the house. There my acquaintance twisted the gaster from the thorax of each queen. The gaster, being about the size and shape of a pea and swollen with eggs, is the edible part. This done, he moistened a bit of salt and mixed it with the gasters. Then he fried them for a few minutes in a frying pan. I don't recall that anything other than wet salt was used in the frying. We ate them while they were still hot. They were crunchy and reminiscent of salt-roasted peanuts, probably more because of the salt than the flavor of the ants themselves. I recall thinking at the time that they would go very well with beer, which, unfortunately, we lacked.

The above was the only occasion on which Professor Jeanne saw the insects eaten. He mentioned that swarming seems to occur only once per year, and this would be the only time the insects could be collected. He didn't recall seeing the product sold commercially in Santarem, or elsewhere, but suggested that it is, perhaps, when in season.

Leafcutter ants are highly prized by the Desâna (**Ribeiro and Kenhiri 1989**). Two kinds are eaten. One, called *dihputiara*, is eaten alive or roasted, and both male and female ants are eaten. The other, called *biapona*, can be kept for a long time by smoking them. Only the winged females are eaten. Seasonal occurrence and method of collection for each species is described by the authors.

**Souza Aquino and Pinkston (1996**, unpublished manuscript) give a festive account of leafcutter collection:

It is a cloudy afternoon in a small town in Northeastern Brazil. Suddenly, a young boy shouts 'Tanajura, Tanajura . . .' Within 5 minutes, an army of kids (some adults too) with cans, plastic bags, and tree branches, are ready to catch this unique ant for food. . . . This ant, characterized by its well-developed abdomen, is a part of Brazilian culture. Especially for those living in rural areas and small towns in Northeastern Brazil. In this region, people chase and eat the ants on a very special day, [special] because of the uniqueness of the event. During the beginning of the rainy season (March-April), one afternoon a year, everyone stops their home activities to go out on the streets and capture hundreds of ants for dinner. . . . eating Tanajura is as common in Brazil

as eating apple pie in America. . . . Generally, people in Brazil eat fried *Tanajura* the evening of the 'catch.' It is somewhat akin to fishing. After a good ant catch, there is a festive celebration. . .

The authors provided a recipe for fried *tanajura* and also discussed the ant as an agricultural problem. They stated that, of the 11 species of *Atta* in Brazil, *A. sexdens* is the most common.

Several other reports of ant consumption in Brazil may refer to *Atta* or to species of other genera. **Humboldt (1850;** vide Cutright 1943: 311) reported that, on the Rio Negro, the Indians ate a white paste containing black spots which proved to be dried, smoked ants. "Several bags of them were hanging above a fire at the time to be used in subsequent repasts." **Steward (1963:** 887) mentioned that the Guiana tribes use pepper juice and ants in hunting ritual. **Chagnon (1968:** 30-32) states that one of the common insect foods of the Yanomamö is the larva of a species of large ant. Only the head is eaten, it being crunchy with a nutty taste.

See also Koch-Grunberg (1909) above under Miscellaneous Coleoptera, and the following under References Cited: Goldman (1963, as food of tribes in northwestern Brazil), Métraux (1963, as food of the Cocama and Omagua in the upper Amazon), Pereira (1954, food of the Maue), and Wallace (1889, as food on the Uaupes River).

### Vespidae (wasps, hornets)

*Brachygastra* (= *Nectarina*) spp., larvae, pupae

Several observers have reported consumption of wasp brood in Brazil. **Lenko and Papavaro (1979:** 173) state that the honey of wasps, especially the genus *Nectarina*, as well as the larvae and pupae from their nests are used as food by many people in Latin America. They cite, among others, A.B.A. da Silva (1962) who reported that the Uaupe Indians collect wasp nests and add flour to eat with the larvae. **Baldus (1970;** vide Lenko and Papavaro, p. 173) reported that the Tapirape eat wasp larvae, called Kaua (= caba), which they roast in their combs, then extract with small sticks or by shaking them out on the hand. ". . . Men and women consider these larvae a delicacy and usually eat them mixed with manioc flour." **Baldus (1937:** 37; vide Lenko and Papavaro, p. 173) also reported the use of wasp larvae by the Kaingang Indians as fish bait. **Ribeiro and Kenhiri (1989)** report that wasp pupae are consumed by the Desâna.

See also Lizot (1977, as food of the Yanomami) in the Introduction.

### Isoptera

There are a number of reports on the consumption of termites in Brazil, but almost nothing is known of the identity of the species used.

### Termitidae (termites)

*Cornitermes* sp., winged adult, soldier, queen

*Termes flavicolle* Perty, soldier

Of *T. flavicolle*, which **Wallace (1853)** describes as a large white ant common in the upper Amazon, he says (p. 243):

. . . It inhabits holes in the earth about the roots of rotten trees [where it is sought] by the Indians. In this case it is not the winged female, but the great-headed, hard-biting worker, and it is by means of his jaws that the creature is entrapped. An Indian boy going after '*cupim*' takes with him a calabash or a bottle-basket, and searches for a nest. He then scrapes away some of the earth, and taking a long piece of grass inserts it as far as it will go, and on withdrawing it finds a row of ten or a dozen *Termes* holding tightly on to it; and he repeats this operation till he fills his basket. These insects are also eaten alive or roasted; but in this case it is not the abdomen but the enormous head and thorax which is devoured, as those parts contain a considerable mass of muscular matter. These insects have generally a bitter taste and are not much esteemed, except by the Indians themselves.

*Cornitermes* sp. (known as *maniuára*) are eaten by the Desâna (**Ribeiro and Kenhiri 1989**). There are four flights per year and as these flights coincide with some *aracu* fish migrations they were bartered; the Tukâno went fishing while the Desâna captured termites. In addition to the winged adults, soldier and queen termites are eaten. Soldiers are eaten either raw or roasted and crushed in a mortar with salt and pepper. Sometimes smoked fish is added and this mixture is spread over tapioca (manioc starch) cakes. Two other species of termites are also

eaten by the Desâna, but only the winged females, not males.

### Miscellaneous Isoptera

**Hegh (1922: 670)** noted that (translation):

The Amazon Indians, who eat only soldiers, obtain them by opening the termite mound a bit and sticking in a long stalk of 'graminee,' which they drive in deeply. The soldiers bite at it firmly and do not let go, so they are easily removed. Often there are 10-13 of them taken out at one time from the nest, so that the amount necessary for a meal is quickly obtained. If it involves termites building only tiny nests, the whole community is transported at one time to the lodging and thrown into a container filled with water.

**Mill (1982;** vide Posey 1987b: 194) states that termites and termite nests provide dietary input, although not as frequently as might be expected considering their abundance. **Posey (1987b: 193-194)** cited Giacone (1949) as reporting the eating of termites by the Macú Indians during shortages of other foods, and Jacob (1974) that the Uaica eat pulverized termite mounds.

See also Lizot (1977) and Milton (1984) in the Introduction, and Pereira (1954, food of the Maue) and Wallace (1889, food on the Uaupes River) under References Cited.

### Lepidoptera

The caterpillars of several species of Lepidoptera have been reported as food in Brazil, but as with most other edible groups, little or nothing is known of the identity of the species used.

#### Hepialidae (ghost moths and swifts)

**Bodenheimer (1951: 307)** cited Daguin (1900), who in turn had cited St. Hilaire who saw natives eating the large caterpillars of a moth (Hepialidae) which lives on bamboo. Great care was taken to remove the head and intestines before consuming the caterpillars.

#### Miscellaneous Lepidoptera

**McGovern (1927;** vide Cutright 1943: 314) tried caterpillars which the Pogsa Indians were prone to eat, and which they procured from certain trees (species not specified). As described by McGovern: "The innards were carefully squeezed out, and only the skins were thrown into the cooking pot. They were boiled for half an hour and the banquet was then declared ready. I was surprised how tough these boiled caterpillars were. They required careful mastication, and both in consistency and in taste, they reminded me rather forcibly of rubber bands."

**Chagnon (1968: 30-32)** mentions that some species of caterpillars are among the insect foods of the Yanomamö. They are not cleaned but simply wrapped, squirming, in leaves and thrown into the coals to roast. They have much less fat than weevil grubs and become dry and crunchy during cooking, having a texture and form much like cheese pone when prepared.

**Ribeiro and Kenhiri** give the vernacular names of seven kinds of caterpillars harvested by the Desâna. Highly prized is the caterpillar known as *bali'i*, not only for its excellent flavor but because it has a gland that secretes an enzyme which the Indians use to remove warts. These caterpillars feed on the leaves of the *japurá* tree; they are about 10 cm long, blue with tiny white spots and no hairs. To harvest the larvae, a trench is dug around the trunk and lined with leaves. The larvae may be boiled (after removing the gland) or prepared by roasting, crushing and then mixing them with salt and dried capsicum peppers.

See also Lizot (1977) and Milton (1984) in the Introduction.

### Orthoptera

There appears to have been surprisingly little use of orthopterans as food in Brazil. **Posey (1987b: 194)** cited Levi-Strauss (1948) who reported the eating of orthopterans (unspecified apparently), and Kevan (1979) who reported the eating of grasshoppers and crickets as a widespread practice in the Americas, presumably including Brazil (as it is cited by Posey).

#### Acrididae (short-horned grasshoppers)

Grasshoppers are collected by the Desána who either roast them in clay pots and crush them with salt and pepper, or smoke them on a spit, as they sometimes do with small fish (**Ribeiro and Kenhiri 1989**).

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**Baldus, H. 1970.** Tapirape: tribo tupi no Brasil Central. Brasileira (Serie Grande Formato) Vol. 17, p. ? Sao Paulo: Companhia Editora Nacional.\* (Vespidae)

**Bates, H.W. 1863.** The Naturalist on the River Amazons. 2 vols. London: John Murray.\* (Formicidae)

**Bodenheimer, F.S. 1951.** Insects as Human Food. The Hague: W. Junk, 352 pp. (A source of citations)

**Chagnon, N.A. 1968.** Yanomamo: the fierce people. New York: Holt, Rhinehart and Winston, pp. 30-32. (Bruchidae, Curculionidae, Apidae, Lepidoptera)

**Cowan, F. 1865.** Curious Facts in the History of Insects; Including Spiders and Scorpions. Philadelphia: Lippincott, 396 pp. (Formicidae)

**Cutright, P.R. 1943.** The Great Naturalists Explore South America. New York: Macmillan, pp. 310-314. (A source of citations)

**Goldman, I. 1963 [1948].** Tribes of the Uaupes-Caqueta region. *In: Handbook of South American Indians*, J.H. Steward (ed), Vol. 3, pp. 763-798. New York: Cooper Square Publ., Inc.

Regarding the Tucanoan, Arawakan, and Cariban tribes in the southern Colombia-northwestern Brazil region, Goldman states that farming dependance is mainly on roots of manioc and fish are the main source of protein. He says, however (p. 770): "Fullest use of wild foods is made by all tribes in the area. Women gather various kinds of edible ants, grubs, berries, and roots. Wild food gathering is not a regular activity; it is undertaken sporadically, either to make up deficiencies in the fish and game diet, or for variety. The known ripening of fruits and berries is almost invariably an occasion for a gathering expedition."

**Hegh, E. 1922.** Les Termites. Bruxelles, p. 670. (Isoptera)

**Humboldt, A. von. 1850.** Views of Nature. London: Henry G. Bohn.\* (Formicidae)

**Lenko, K.; Papavero, N. 1979.** Insetos no Folclore. Sao Paulo: Conselho Estadual de Artes e Ciencias Humanas, pp. 173, 276-280. (Formicidae, Vespidae)

**Lizot, J. 1977.** Population, resources and warfare among the Yanomami. *Man* (N.S.) 12: 497-517. (Introduction)

**McGovern, W.M. 1927.** Jungle Paths and Inca Ruins. New York: The Century Co.\* (Formicidae, Miscellaneous Lepidoptera)

**Metraux, A. 1963 [1948].** Tribes of the Middle and Upper Amazon River. *In: Handbook of South American Indians* (J.H. Steward, ed.), Vol. 3, pp. 687-712. New York: Cooper Square Publ., Inc.

In discussing the Cocama and Omagua, Tupian tribes of the upper Amazon (Brazil-Peru), Metraux (p. 692) mentions that wild foods include palm grubs, ant eggs [probably actually larvae and/or pupae] and honey.

**Mill, A.E. 1982.** Amazon termite myths: Legends and folklore of the Indians and Caboclos. *Bull. Roy. Entomol. Soc. London* 6(2): 214-217.\* (Isoptera)

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**Noice, H.H. 1939.** Back of Beyond. New York: G.P. Putnam's Sons, pp. 120-121. (Formicidae)

**Orton, J. 1870.** The Andes and the Amazon; or, Across the Continent of South America. New York: Harper & Brothers, 356 pp. (Formicidae)

**Pereira, N. 1954.** Os indios Maues. Rio de Janeiro: Organizacao Simoes.\*

Pereira reports that the Maue make a paste of termites and ants which is roasted in banana leaves.

**Posey, D.A. 1978.** Ethnoentomological survey of Amerind groups in lowland Latin America. *Florida Entomologist* 61: 225-229. (Introduction)

**Posey, D.A. 1983a.** Indigenous knowledge and development: An ideological bridge to the future. *Ciencia e cultura* 35(7): 877-894.\* (Apidae)

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**Spruce, R. 1908.** Notes of a Botanist on the Amazon and Andes, 2 vols. London: Macmillan. (Curculionidae)

**Steward, J.H. 1963 [1948].** Culture areas of the tropical forests. *In: Handbook of South American Indians*, J.H. Steward (ed.), Vol. 3, pp. 883-899. New York: Cooper Square Publ., Inc. (Formicidae)

**Steward, J.H.; Metraux, A. 1963 [1948].** The Peban tribes. *In: Handbook of South American Indians*, J.H. Steward (ed.), Vol. 3, pp. 727-736. New York: Cooper Square Publ., Inc.

The authors report (p. 730) that the Yameo, one of the main Peban tribes, make a sauce of red pepper, grubs, and maize flour, and that honey and palm larvae are among the more important "wild fruits" collected by the Yameo and the Yagua (also a Peban tribe).

**Wallace, A.R. 1853.** On the insects used for food by the Indians of the Amazon. *Trans. Entomol. Soc. London*, (N.S.) 2: 241-244. (Curculionidae, Membracidae, Formicidae, Termitidae)

**Wallace, A.R. 1889.** A Narrative of Travels on the Amazon and Rio Negro, 2nd ed. New York: Dover Publs, Inc., p. 201.

Wallace, who travelled up the Uaupes River in 1851, mentions (p. 201): "The large saubas [*Atta* ants] and white ants [termites] are an occasional luxury, and when nothing else is to be had in the wet season they eat large earth-worms, which, when the lands in which they live are flooded, ascent trees, and take up their abode in the hollow leaves of a species of *Tillandsia*, where they are often found accumulated by thousands. Nor is it only hunger that makes them eat these worms, for they sometimes boil them with their fish to give it an extra relish."

Chapter 6 of *The Human Use of Insects as a Food Resource: A Bibliographic Account in Progress*, by Gene R. DeFoliart, posted on website July, 2002.

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#### Items Needing Attention

Pp. 6, 16: Netolitzky (1920), certain pages awaiting retranslation.

P. 16: Baldus (1970), vol. 17, page no.?

