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A BRIEF NOTE ON EDIBLE INSECTS IN ECUADOR

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Ecuador still conserves the ancestral tradition of entomophagy, notably in the countryside where the native population is relatively isolated from technological progress. Eighty-three (83) edible species are listed for the country; none of them are a main dish but many of the insects are used to complement other animal protein sources in the diet. The most common edible insects belong to the orders Coleoptera and Hymenoptera, which are consumed either in the larval or adult stage.

KEY WORDS: Ecuador, entomophagy, edible insect species.

INTRODUCTION

In their early history, humans obtained most of their protein from vertebrates through hunting and fishing. However, in natural ecosystems, these animals have fairly fixed reproductive rhythms and when humans were short of protein, collecting insects represented an interesting and permanent alternative (Bodenheimer 1951). In fact, insects represent a wholesome food. For example, 100 g of dried termites contains on average 53% protein, 15% fat and 3.5% of carbohydrates as well as significant amounts of phosphorus, iron, sodium and potassium (Tosi and Daccordi 1983). Insects can be consumed in different ways, raw, fried, boiled, salted and dried, smoked, and as ingredient of sauce.

In Ecuador; the tradition of entomophagy is very old. This has been demonstrated by archaeological records conserved in the museums of Quito, where edible insects from the orders Coleoptera

and Lepidoptera are represented. Also, reports of the early colonization period mention the entomophagy of the ecuadorian populations (De Velasco 1789), a tradition that is still alive today especially in the remote areas of the country (Figuerola and Albuja 1983, Gonzalez and Ortiz de Villalba 1985).

In Ecuador, we can distinguish three types of entomophagy: (1) involuntary entomophagy, (2) entomophagy for hygienic reasons, and (3) entomophagy for nutritional reasons.

Involuntary entomophagy includes all those cases of ingestion of insects without intent or even without realizing. This form of entomophagy is very frequent. Virtually all fruits and vegetables and many other types of food contain insects or fragments of insects that are ingested with their hosts unnoticed by the consumer. The most common example is the fruit fly larva, *Anastrepha* spp. (Diptera), in guava fruits (*Psidium guajava* L.).

As an example of the second form of entomophagy, in Ecuador mothers have the habit of picking lice (*Pediculus hominis capitis* De Geer) from the hair of their children. The lice are often not discarded, but eaten by the mother.

In general however the main scope of entomophagy is to provide protein or add variety and taste to the diet. It is this latter form of entomophagy that is the focus of this paper.

INVENTORY OF EDIBLE INSECTS IN ECUADOR

In order to obtain a preliminary inventory of edible insects, I gathered information on my field trips all around Ecuador from 1980 to 1995. My information sources were the natives as well as personal observations during meals, hunting, agricultural activities and market transactions with the native populations. Specimens of edible insects were collected wherever possible, both as imago and as associate adult when larvae. The available edible insects were also tasted in order to try their palatability. The insects were prepared and labeled in the field and then brought to the Quito Catholic Zoology Museum (QCAZ) where they were stored and identified. For the systematics of the insects, I followed the classification of Borror *et al.* (1989).

The inventory of edible insect species in Ecuador thus obtained is reported in Table I. In this table, the edible instar of the exapod is indicated with (–) for larva, (@) for pupa and (+) for imago. In three cases, the native shuaras informers could not provide samples of the caterpillars consumed in the area due to seasonal unavailability. For these cases, only the local name has been reported in Table I.

As can be seen from Table I, the insects currently consumed in Ecuador belong to the following orders: Coleoptera, Hymenoptera, Lepidoptera, Homoptera, Orthoptera and Odonata.

COLEOPTERA

The order of the Coleoptera comprises the beetles, that in Ecuador are called ‘catsos’ in the adult stage and ‘cuzo’ in the larval stage. These insects can be served boiled with salt, cooked with onions, or eaten alive, such as *Metamasius* spp. Raw *Metamasius* spp. could definitely compete with peanuts for their taste.

Around the time of the ‘finados’ (All Souls’ Day), the white beetle *Leucopelaea albescens* (‘catso blanco’) emerges in big numbers and is actively sought after in the area around Quito. In the early morning between three and four a.m., the native hunters explore the slopes of The Andes in the vicinity of Quito. According to the tradition, the success of the harvest is directly related to the rain and thunder noise. At home, the elytra and legs of the beetles are removed. Then the beetles are fried in pork fat with a local variety of long, white, leek-like onion, salted and served with ‘mote’, a kind of soft maize. The taste of *Leucopelaea albescens* is similar to scraps of pork.

In the ‘paramo’ (grassy and bushy areas in The high Andes) of Antizana, farmers harvest the green beetle *Pelidnota nigricauda* (‘catso verde’), a species closely related to the white beetle found around Quito. The inhabitants of the inter-Andean valley use various other species of Coleoptera as food that are closely related to the beetles mentioned above, but definitely less tasty. In latter region, fried balls of mixed beetles may include several species of insects. In Salcedo, Calderón and Otavalo, the ‘catsos blancos’ used

TABLE I
Edible insect species from Ecuador

Coleoptera

- Metamasius cinnamominus* Perty (Curculionidae) +
M. dimidiatipennis Jekel (Curculionidae) +
M. hemipterus L. (Curculionidae) +
M. sericeus Olivier (Curculionidae) +
Cosmopolites sordida Germar (Curculionidae) +
Rhynchophorus palmarum L. (Curculionidae) -, @
Dynamis nitidula Guérin (Curculionidae) -, @
D. perryi Waterhouse (Curculionidae) -, @
Rhinostomus barbirostris Fabricius (Curculionidae) -, @
Pelidnota nigricauda Bates (Scarabaeidae) +, -
Platycoelia forcipalis Ohaus (Scarabaeidae) -
P. parva Kirsch (Scarabaeidae) -
P. rufosignata Ohaus (Scarabaeidae) -
Leucopelaea albescens Bates (Scarabaeidae) +, -
Ancognatha castanea Erichson (Scarabaeidae) -
A. jamesoni Murray (Scarabaeidae) -
A. vulgaris Arrow (Scarabaeidae) -
Coelosia biloba L. (Scarabaeidae) -
Heterogomphus bourcieri Guérin (Scarabaeidae) -
Dynastes hercules L. (Scarabaeidae) -
Golopha aegæon Drury (Scarabaeidae) -
G. aeacus Burmeister (Scarabaeidae) -
Praogolofa unicolor Bates (Scarabaeidae) +, -
Democrates burmeisteri Reiche (Scarabaeidae) -
Clavipalpus antisanae Bates (Scarabaeidae) -
Sphaenognathus feisthamelii Guérin-Ménéville (Lucanidae) -
S. lindenii Murray (Lucanidae) -
S. metallifer Bomans & Lacroix (Lucanidae) -
Oncideres sp. (Cerambycidae) +, -
Psolidognathus cacticus White (Cerambycidae) -

Hymenoptera

- Atta cephalotes* L. (Formicidae) +
A. sexdens L. (Formicidae) +
Megachile sp. (Megachilidae) -
Bombus atratus (Apidae) -
B. funebris (Apidae) -
B. ecuadorius (Apidae) -
B. funebris (Apidae) -
B. robustus (Apidae) -
Apis mellifera (L.) (Apidae) -, @
Tetragonisca angustula Latreille (Apidae) -
Angiopolybia paraensis (Spinola) (Vespidae) +
Apoica pallens (Fabricius) (Vespidae) +
A. strigata Richards (Vespidae) +
A. thoracica R. de Buysson (Vespidae) +
-

(continued)

TABLE I (continued)
Edible insect species from ecuador

Mischocyttarus rotundicollis Cameron (Vespidae) +
M. tomentosus Zikan (Vespidae) +
Polistes bicolor Lepeletier (Vespidae) +
P. deceptor Schultz (Vespidae) +
P. occipitalis Ducke (Vespidae) +
P. testaceicolor Bequaert (Vespidae) +
Polybia aequatorialis Zavattari (Vespidae) +
P. dimidiata (Fabricius) (Vespidae) +
P. emaciata Lucas (Vespidae) +
P. flavifrons Smith (Vespidae) +
Stelopolybia baezae Richards (Vespidae) –
S. corneliana Richards (Vespidae) –
S. lobipleura Richards (Vespidae) –
S. ornata Ducke (Vespidae) –
Synoeca virginea Fabricius (Vespidae) +
Brachymenes wagnerianus Saussure (Vespidae) +
Montezumia dimidiata Saussure (Vespidae) +
Angiopolybia paraensis Spinola (Vespidae) +
Apoica pallens Fabricius (Vespidae) +
A. pallida Olivier (Vespidae) +
A. strigata Richards (Vespidae) +
A. thoracica R. de Buysson (Vespidae) +
Brachygastra lecheguana Latreille (Vespidae) –

Lepidoptera

Castnia daedalus Cramer (Castnidae) –
C. licoides Boisduval (Castnidae) –
C. licus Drury (Castnidae) –
Brassolis astyra Godman & Salvin (Brassolidae) –
B. sophorae L. (Brassolidae) –
Hepialus sp. (Hepialidae) –
‘*Tarnpidura*’ (Unknown) –
‘*Yankinia*’ (Unknown) –
‘*Pitiusip*’ (Unknown) –

Homoptera

Umbonia spinosa Fabricius (Membracidae) +, –
Carineta fimbriata Walker (Cicadidae) +

Odonata

Aeschna brevifrons Hagen (Aeschnidae) –
A. marchali Rambur (Aeschnidae) –
A. peralta Ris (Aeschnidae) –
Coryphaeschna adnexa Hagen (Aeschnidae) –

Orthoptera

Schistocerca sp. (Acrididae) +

Family in parentheses.

Edible instar is indicated as follows: - for larva, @ for pupa and + for imago.

as food are bigger in size than the ones from the Quito region and belong to the species *Praogolofa unicolor*. Very often farmers in the highlands compete with chicken and dogs for the harvest of the 'cuzos' or white grubs, which they store in 'shigras' (a traditional bag) to add some variety to their dinner.

Probably the best-known Coleoptera used as food is the palm weevil *Rhynchophorus palmarum*, known locally as 'mayón', 'gualpa' or 'chontacuro'. With regard to this insect, there is an interesting anecdote from the Napo area. In the fifties, the Capuchin missionary Angel de Ucar, a great lover of plants and animals, introduced from neighboring Colombia the first African oil palm (*Elaeis guineensis* Jacq.) in the Coca Catholic Mission, probably for decorative reasons. The native quichuas, living in the area of the Mission, traditionally cut the living trees of *Mauritia flexuosa* L., a local palm species growing in swampy forests ('morete'), and *Bactris gasipaes* H.B.K., a spiny cultivated palm ('chonta'), in order to attract the palm weevil for oviposition. After several weeks, the natives return to the felled trunks to harvest the fat weevil larvae. Given their traditional use of the palm trees, the natives were very intrigued about the use of the introduced exotic palm and decided the missionary used the African oil palm to rear fatter weevils as a delicacy for the bishop. So they baptized the African oil palm as 'chontacuro-del-obispo' which is literally translated as palm for rearing weevils for the bishop.

The shuaras, native hunters of the forest in the center-east Ecuadorian Amazon collect for food, among other resources, small weevils related to Arecaceae (palms and relatives), which are consumed alive as appetizer. In the Saraguro area the fat long-horned beetle larvae of *Psalidognathus cacicus* are fried and used as food and medicine.

HYMENOPTERA

Among the Hymenoptera, bees, wasps and ants are used as food throughout the country. Although virtually everyone is familiar with the taste of honey of bees (*Apis mellifera* L.), few know the delicious taste of the fat larvae inside the honey comb. After the

arrival of the killer bees in Ecuador at the end of the seventies, they occupied the entire country. The native community of S. Lorenzo learned quickly how to harvest honey and consume the honey combs full of larvae and pupae.

In Portoviejo and many other, places, the nests of the wasp *Brachygastra lecheguana* ('belton') are collected to obtain the honey and are eaten with the larvae and pupae inside. The shuaras in Macas and Sevilla Don Bosco use bags to capture the wasp nests and then roast their inhabitants for consumption.

Regular consumers of wasps guarantee that they taste very good, however, in some occasions ingestion of wasp has been reported as a cause of some impairment to the hearing. I have tried meticulously every single species of edible wasp without experiencing this problem. Probably, the hearing impairment can be related to the nutrition of the wasp, since at particular moments of the year the wasp visits toxic flowers.

Our colombian neighbors appreciate very much flying ants as food, which they know under the local name 'culonas'. In Santander, they are a typical dish which is served at the local airport. The same tradition of eating ants survived in the eastern parts of Ecuador where the species *Atta cephalotes* and *Atta sexdens* are consumed by the local population and are known by the native quichuas as 'añangu'. *Atta* spp. have a unique and fatty taste.

In Ecuador there are at least hundred species of stingless bees (Meliponidae) which are appreciated for their lemon-like honey. During the honey harvesting, the hunter often also eats the larvae mixed with honey and pollen. I observed the same custom in the Valladolid area with a tiny *Tetragonisca angustula* brood-comb. Children in the inter-Andean valley carefully search in the holes and cracks of the bamboo trunk for nests of the leafcutting bee, *Megachile* sp. The children eat the contents of the nests including the larvae.

LEPIDOPTERA

Larvae of various species of Lepidoptera (butterflies and moths) are eaten on both sides of The Andes, in particular the larvae

belonging to the Hepialidae, Brassolidae and Castnidae. The larvae of the Castnidae are considered by their consumers as a variety of weevils because of their relationship to the palms as are the weevils. The shuaras in Sucúa boil and fry unidentified caterpillars which they call 'tapindura', 'yankinia' and 'pitiusip'.

HOMOPTERA, ORTHOPTERA, AND ODONATA

Homoptera, Orthoptera and Odonata include also edible insects. The bean tree (*Inga edulis* Mart.) is the host of colonies of treehoppers *Umbonia spinosa*; the juvenile insects of this species are highly appreciated for their taste. They are consumed when their spines are still tender. In later stages, the spines can generate serious problems at the moment of ingestion. Personally, I tried the hoppers with disappointment and sore throat. Within the Orthoptera order, the grasshoppers are much appreciated by natives throughout The Andes. The preferred grasshoppers are related to the genus *Schistocerca*.

Frequently, over the surface of swamps, one finds big green and brown colored dragonflies (Odonata) that have aquatic larvae. In the vicinity of Latacunga, the aquatic larvae belonging to the genus *Aeschna* are consumed in the same way as fresh-water fish.

CONCLUSION

In Ecuador, the tradition of entomophagy is found all over the territory, but especially in The High Andes and Amazon where the natives have less contact with western 'civilization'. The most consumed exapods are definitively the beetles, followed by ants, wasps, caterpillars and other minor groups. A first inventory has resulted in 84 edible insect species. The author guarantees from his personal experience that the organoleptic characteristics of edible insects are varied but almost always excellent. Definitively the most-valued delicacy are the larvae of *Rhynchophorus palmarum*, followed by *Leucopelaea albescens*.

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