

THE USE OF BUTTERFLIES AND MOTHS IN HUMAN LIFE

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Insects not only play a significant role in the ecological process of nature but since pre-historic times have also formed a part of the human diet. Many species of Lepidoptera provide benefits to humans. Silk cocoons produced by the last instar larvae of certain species yield high-quality silk, which can be processed and exploited in the textile industry, resulting in income generation (Figure 1). Moreover, the wings of some butterflies and moths are used for decoration purposes.

Lepidoptera, one of the most diverse insect orders, contains many popular edible species that have been consumed traditionally for centuries across the globe. Currently, about 24 families with a total of about 350 edible lepidopteran species were recorded (Figure 2). They are often praised for their excellent nutritional value, such as having high protein and healthy fat content. Edible lepidopterans also contain minerals, essential amino acids, and vitamins, making them a nutritious addition to a balanced diet. They also contain bioactive compounds which have various nutraceutical and pharmaceutical properties.

Human butterfly and moth eating is common to cultures in most parts of the world. Today butterfly and moth consumption is rare in the developed world, but remains a popular food in many developing regions of Latin America, Africa, Asia, and Oceania. Larvae and pupae of some species of butterflies and moths serve as food for many ethnic groups around the world (Figure 3). They are often prepared charcoaled in salty water or, in some



Fig. 1 - Stationery card of China 2006 depicting silkworm moth and cocoon

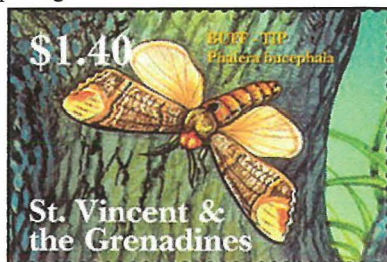


Fig. 2 - Stamp of St. Vincent & Grenadines 2001 featuring the *Phalera bucephala* moth, whose pupae are eaten in China



Fig. 3 - Stamp of North Korea 1965 depicting moth *Samia cynthia*, whose caterpillars and pupae are eaten in Southeast Asia

cases, fried or mixed with other food. These insects contribute a great amount of energy and protein to indigenous diets.

Plant-based meat has thrived in Asia for centuries — and it's still going strong. The Asia Pacific region has the most extensive variety of edible insects species, and with a growing population and increasing food demand, reliance on edible

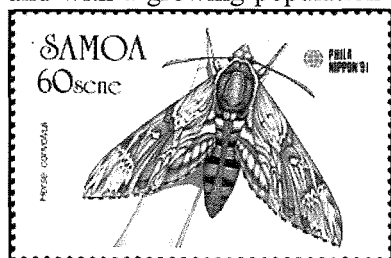
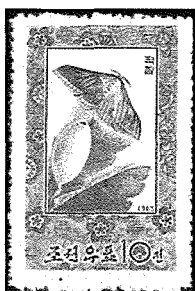


Fig. 4 - Stamp of Samoa 1991 with image of moth *Herse convolvuli* - caterpillars and moth pupae are eaten in Southeast Asian countries

Fig. 5 - Stamp of North Korea 1965 with image of Chinese Tussar Moth - *Antheraea pernyi*



insects is expanding. Countries, such as China, South Korea, Thailand, Burma, Vietnam, Laos and India, are known for consuming and retailing edible insects. Commonly consumed insects include silkworm pupae, bamboo worms, and others (**Figure 4**). Insect farming for food was probably initially a by-product of silk production. In China, mulberry silkworm farming started over 5,000 years ago. A variety of insects are currently farmed in China for food, feed and other purposes. These include

over 260,000 tons of mulberry silkworm (*Bombyx mori*) and tasar silkworm (*Antheraea pernyi*) pupae annually for silk production, food and medical research (**Figure 5**). Silkworm pupae are commonly eaten in other Asian countries, including Japan and Thailand and on the Korean Peninsula. Silkworm pupae are considered a premium source of animal protein. In the Republic of Korea, silkworm powder is being produced as a medicine for diabetics because

of its blood glucoselowering effect. In Thailand, in 1987, the Thai Ministry of Public Health included silkworm pupae on a list of local foods that could be used in supplementary food formula developed for malnourished infants and pre-school



Fig. 6 - Stamp of Laos 2013 with caterpillars and cocoons of silkworm

children. They are fried and ground into a coarse powder that is then added to curries and soups. The percentage of the population of the Lao People's Democratic Republic that regularly consumes insects is among the highest in the world. The most preferred and frequently consumed insects in Lao PDR are silkworm larvae and pupae, bamboo caterpillars (**Figure 6**).

The traditional diets of many communities in India's northeast include insects for their nutritional, economic and ecological benefits. Silk worms are very popular: the larvae and pupae of varieties like eri

polu (*Attacus ricini*) and muga polu (*Antheraea assama*) are considered to be healthy and are eaten fried, roasted or raw (**Figure 7**). The silkworm's late instar larvae and pupae are also eaten raw with salt and chilli or roasted with herbs as a snack.

Australia boasts the highest diversity of root dwelling Lepidoptera consumed worldwide, the second largest order of insects in the world. Its most notable member is witchetty grub', the larva of a species of *Endoxyla leucomochla*

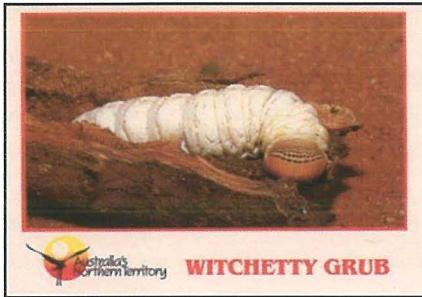


Fig. 8 - Australia postcard 1994 - Witchetty grub aboriginal delicatessen

barbecued. The latter results in a nice, crunchy skin.

Australian aborigines feasted on Bogong moths (*Agrotis infusa*) harvesting them in large numbers during the winter months from the caves and crevices of the Bogong High Plains (**Figure 9**). They roasted the moths in hot ashes where their legs and wings fully burn. Then they sieve them through a mesh to eliminate the moth heads. The resulting mass is kneaded and molded into



Fig. 10 - Stamp of Vanuatu 2003 with moth Hippotion celerio

pellets that are fried in an open flame, or the moths milled into a powder that is diluted with water until obtaining a kind of cookie dough.

Australia recorded the highest number of edible Lepidoptera species (17) in the region. Among the larvae of edible insects, natives use also caterpillars of the species known locally as "elephant grub" (*Hippotion celerio*) (**Figure 10**).

The consumption of edible insects by the indigenous



Fig. 7 - Stamp of North Korea 1991 with Eri silkworm *Attacus ricini*

(**Figure 8**). The witchetty grub is one of the most famous items on the Aboriginal bush

tucker menu. Similar grubs are found across Australia. Witchetty grub is the high-protein larvae. There's a chubby, nutritious Australian moth larvae that looks like a long, segmented marshmallow. The grubs are traditionally eaten raw or skewered and

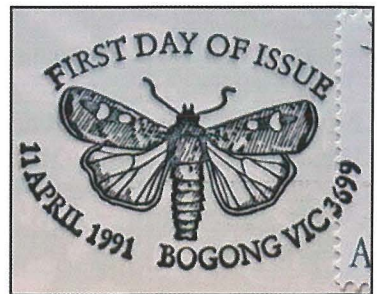


Fig. 9 - Special cancel of Australia 1991 with Bogong moth



Fig. 11 - Stamp of New Zealand 1997 with image of Puriri Moth



Fig. 12 - Stamp of Papua New Guinea 1979 with image of moth *Nyctalemon patroclus*

(**Figure 13**). Some caterpillars are sold not only in the local village markets, but are shipped by the tons from one country

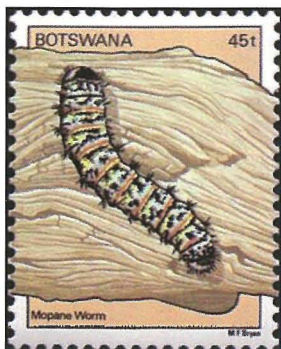


Fig. 14 - Stamp of Botswana 1981 - the Mopane worm is the larval stage of the moth *Gonimbrasia belina*

peoples of New Zealand is well known. In New Zealand, insects are reported as a traditional food for the Maoris ethnic group. Caterpillars of the convolvulus hawk-moth (*Agrius convolvuli*) and Puriri Moth (*Aenetus virescens*) are considered traditional food for the Maori ethnic group (**Figure 11**).

In Papua New Guinea, insects have been consumed as a traditional food source for centuries. They are often collected from the wild, and the selection of insect species and the methods of preparation and cooking vary among different ethnic groups. Among lepidopterans, the most favorite delicacy is the caterpillars of the *Nyctalemon patroclus* moth (**Figure 12**).

About 140 species of edible lepidopterans from 18 families are recorded in 35 African countries. The consumption of caterpillars is especially pervasive in sub-Saharan Africa, where 30 percent of all edible insect species are caterpillars. In the Democratic Republic of the Congo, caterpillars make up 40 percent of the total animal protein consumed. There they are collected and consumed by more than 30 species



Fig. 13 - Stamp of Congo 1971 depicting the edible *Bunaea alcinoe* moth caterpillar

to another. There are even processing plants where caterpillars are canned in Botswana and South Africa. The most popular and profitable caterpillar on the African continent is undoubtedly the mopane caterpillar, *Gonimbrasia belina* (**Figure 14**). Endemic to the mopane woodlands in Angola, Botswana, Mozambique, Namibia, South Africa, Zambia and Zimbabwe, the caterpillar's habitat extends over about 384 000 km² of forest. An estimated 9.5 billion mopane caterpillars are harvested annually in southern Africa (**Figure 15**). In some areas of Africa, the large, spiny mopane worms are so popular that when they are in season, crawling all over



Fig. 15 - Stamp of Botswana 1985 - woman collecting the Mopane worms



Fig. 17 - Stamp of Burundi 2014 depicting caterpillar and moth *Cirina forda*

Some lepidopteran species have a unique feature, the ability to produce silk. The African species of wild silkworms include three major families: Saturniidae (Ephiphora and Argema species); Lasiocampidae (Gonometa species); and Thaumetopoeidae (Anaphe, Epanaphe, and Hyposoides species), and all of these have significant economic importance. Many of these wild silkworms have been utilized locally and regionally by the indigenous communities to a modest degree. However, the most important species used in

village and jungle trees, the sale of beef and other protein meats is seriously affected. The caterpillars are collected by hand and then degutted, boiled in salted water and sun dried. Dried mopane caterpillars will last for several months and can be a valuable source of nutrition in times of stress. The caterpillars are collected by hand and then degutted, boiled in salted water and sun-dried (Figure 16). Dried mopane caterpillars will last for several months and can be a valuable source of nutrition in times of stress. Another popular moth is the shea tree caterpillar, *Cirina forda*. It can be found throughout sub-Saharan Africa, and is the most economically important edible saturniid since it is consumed and traded in all the regions where it is found (Figure 17). Edible saturniid caterpillars are nutrient rich and hence form an important part of the diet for many people in SSA. The most popular species include *Gonometa postica* (Figure 18). Other caterpillars are also consumed, but to a lesser extent. Some African species in the larval stage are preserved by pickling and are then exported to European cities.



Fig. 16 - Caterpillars of the *Gonimbrasia belina* moth as African Delicacy on the Venda stationery card 1991



Fig. 18 - Stamp of Namibia 2010 featuring the edible caterpillar of the moth *Gonometa postica*



Fig. 19 - Stamp of Congo 1999 with image of moth *Anaphe panda*

In South America, Indigenous Peoples commonly include insects in their diets as part of their daily routines. The Païter Suruí, an Indigenous group in the southwestern Brazilian Amazon have traditionally included caterpillars of *Lusura altrix* moth in their diet. Some ethnic groups in Peru are known to preserve many traditional habits, including consumption of caterpillars and other undetermined insect species. Ashaninka communities consume larval Lepidoptera including *Castnia daedalus*, *Eupalamides cyparissias*,



Fig. 20 - Stamp of Guyana 1994 with image of butterfly *Brassolis astyra*

wild silk production in Africa is *Anaphe panda* because it produces a huge cocoon nest that is communally weaved by 20–200 silkworm larvae (**Figure 19**). Larvae of *Anaphe panda* are also a local delicacies in West African countries such as Nigeria, Cameroon, Congo to meet the protein requirements of communities as a planned part of the diet throughout the year or when they are seasonally available.

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67 species of Lepidoptera are eaten principally in their larval stage in 17 states of Mexico. There are 29 ethnic groups that consume lepidoptera species *Phoebis agarithe*, or the “monarch butterfly” (*Danaus plexipus*), *Danaus gilippus* *thersippus* or *Pterourus multicaudata* people eat adults (**Figure 21**). There are other species, such as *Phassus trajesa*, *Laniifera cyclades*, *Ascalapha odorata*, for which people search laboriously (**Figure 22**). These caterpillars are the subject of massive gathering in several of the States of Mexico, where they are profusely eaten. Generally, is the larvae that are eaten. Peasants qualified them as a very good and



Fig. 21 - Stamp of Mexico 1988 with image of Monarch butterfly



Fig. 22 - Stamp of Grenada 1993 with moth *Ascalapha odorata*

nutritious “worms”, pure vitamins, to refer to the quantity of proteins they lodged (**Figure 23**). They are prepared roasted with salt, and in populations with a higher economic purchase they are fried with oil or lard joining always pepper, salt, in tortillas (maize crepes).

The trade of Lepidoptera larvae still persists being sold in markets in several areas of Mexico and even at the capital, as the red and white agave worms. These species are in great demand, in large part due to their exquisite flavor. A mescal worm (the caterpillar of the *Comadia redtenbacheri* moth) are used frequently by several brands of mescal to give flavor to the



Fig. 23 - Stamp of Venezuela 1968 with edible caterpillar of *Spodoptera frugiperda* moth

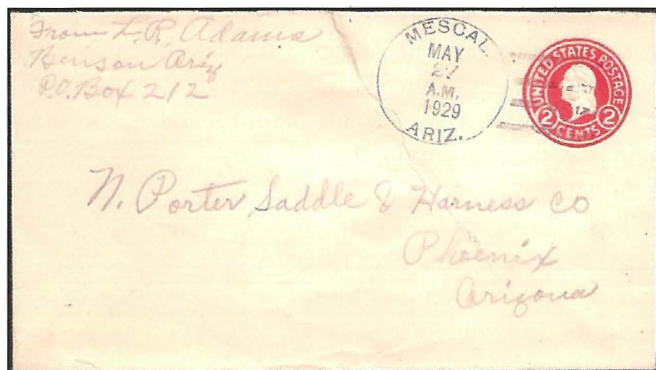


Fig. 24 - Entire postal of USA post passed in 1929 with postmark Mescal. The small American town of Mescal is located in the southeast corner of Arizona, on the Mexican border

drink (**Figure 24**). A whole larva is deposited in the bottle, normally after having previously been cured in pure alcohol.

Natives from the North American west have been extensively documented to consume Lepidoptera. Eleven species, within six families were used as a food source by North American native peoples. Larvae of the pandora moth (*Coloradia pandora*) were collected and consumed by natives in western North America. The Cahuilla Band of Indians would travel long distances to gather the large larvae (7-10 cm) of the white sphinx moth (*Hyles lineata*) from a variety of plants (**Figure 25**). Once prepared, the larvae could be



Fig. 25 - Stamp of Cayman Islands 2017 with moth *Hyles lineata*



Fig. 26 - Stamp of Venezuela 1968 with caterpillar of moth *Manduca sexta*

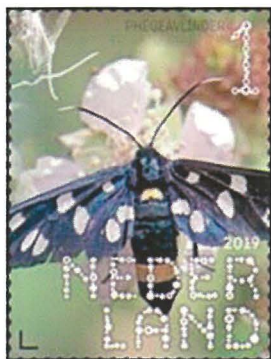


Fig. 27 - Stamp of Netherlands 2019 with image of moth *Syntomis phegea*



Fig. 29 - Stamp of Taiwan 1992 featuring a stylized image of fishing using a wax moth caterpillar as bait

lightly roasted and eaten immediately, or the heads would be removed and the bodies dried and ground into a powder. The larvae of the tobacco hornworm (*Manduca sexta*) were consumed by natives of the continental west (Figure 26). For example, the Pima gathered these caterpillars and sometimes added them to a soup or stew along with vegetables, meal or seeds. As with other larvae, these were also commonly roasted or fried, and sometimes

dried to be made into a powder or otherwise stored for the winter.

In Europe the only record of edible lepidopterans found is from Italy. Ulysse Aldovandi in his 1602 treatise “De Animalibus Insectis Libri Septem” mentioned that in Italy with obvious delight eat fried silkworms. In the Carnia region of northeast Italy it is customary for children to eat the sweet ingluvies of a brightly coloured moths *Zygaena ephialtes* and *Zygaena transalpina*, also moth *Syntomis phegea* (Figure 27). Children collect the moths in early summer when they are plentiful and dissect them themselves, eating only the ingluvies.

The large wax moth (*Galleria mellonella*), distributed throughout the world, is considered a pest because it lays larvae in honey bee hives (Figure 28). There, the caterpillars feed on honey, pollen and wax, damaging everything around them. But nevertheless, a useful use was found for these harmful caterpillars. Wax moth caterpillars are often

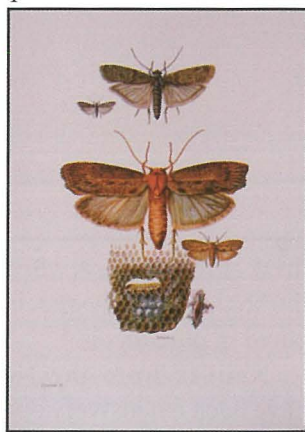


Fig. 28 - German postcard from 1961 showing an adult wax moth and its caterpillar

used as fishing bait (Figure 29). Since the 19th century, a medicine has been made from wax moth larvae to treat tuberculosis and heart disease. In 2017, an international team of scientists discovered a phenomenon in wax moth caterpillars in which the larvae break down plastic using



Fig. 30 - Meter mark of Germany 1938 featuring a caterpillar

enzymes contained in their saliva. Polyethylene is one of the most difficult plastics to break down. This revolutionary news has paved the way for new solutions to manage plastic waste through biorefinery/recycling/degradation.

Edible insects have a very broad prospect as food sustainable resources development in future. Caterpillars constitute an important source of proteins and other essential nutrients (**Figure 30**). They contain more proteins than chicken and beef with an appreciable amount of purified fatty acid. They are also known as a good source of iron, zinc, vitamin and carbohydrates.

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