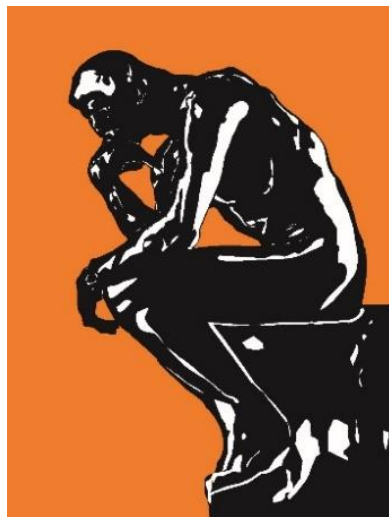


Nutrition from insects: An age-old Vietnamese view versus the modern world's perspective

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“[...] try eating different kinds of nuts and worms. Mastering all of this would guarantee a prosperous life.”

—In “Food”; *The Kingfisher Story Collection* (2022a)

Abstract

Due to the rising pressure from population growth and environmental crises induced by anthropogenic food production activities, the production and consumption of insects have been promoted internationally. The current paper discusses the nutritional and environmental benefits of insect consumption and the socio-cultural and psychological factors that constrain such a habit on an international scale. Then, some historical and cultural information regarding insect consumption in Vietnam is provided to highlight the potential of insect consumption standardization. Unlike those in Western societies, where people exhibit significant psychological resistance to the idea of consuming insects as food, Vietnam has a longstanding tradition of entomophagy, resulting in far less resistance to this practice. Insects have not only been consumed widely in recent times, but they also have a historical root thanks to the early contribution of Nguyen Cong Tieu, a leading Vietnamese agriculture scientist since the French domination period (1884-1945). Nevertheless, insects are commonly viewed as street food or regional specialties but not dietary food, and the perception that insects are “poor man’s diet” persists, which can hinder the standardization of insect consumption within Vietnamese society. To capitalize on the nutritional sources from insects, we suggest that insect-eating should be embraced as an expression of progressive culture for environmental sustainability, and more interdisciplinary research in emerging countries, like Vietnam, could be conducted for the sake of good.

Keywords: insect-eating; entomophagy; food neophobia, taste; scientific information; culture; Vietnam

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With a global population of 9 billion in 2030, ensuring a protein supply is a challenging task. At the same time, livestock farming for meat becomes difficult due to its contribution to increasing greenhouse gases in the atmosphere. Therefore, more international discourse has recently been on consuming insects as a nutritional source. In this essay, we discuss some potential and challenges of insect consumption as food and provide historical and cultural evidence highlighting the potential of standardizing insect consumption in Vietnam.

Studies have found myriad potential health benefits from consuming insects (or entomophagy). A recent systematic review of the available evidence on the health outcomes of consuming insects indicates that insects are generally safe to eat and provide outcomes that are either beneficial or neutral compared to other foods. Such benefits include promoting growth and influencing iron levels when added to supplementary foods, modulating gut microbiota with some prebiotic effects, and providing amino acids comparable to those found in soya protein (Stull, 2021). Smith et al. (2021) suggest that adding a modest portion of regionally appropriate and farmable insect species can substantially alleviate the risks of nutritional deficiencies in Africa and Asia. Based on their calculation, the inclusion of insects in diets could lead to around 67 million fewer individuals at risk of protein deficiency, 166 million fewer individuals at risk of zinc deficiency, 237

million fewer individuals at risk of folate deficiency, and 251 million fewer individuals at risk of vitamin B12 deficiency.

Besides nutritional benefits, insect production is less environmentally harmful than livestock production. While production of animal-source food production requires a vast amount of land for grazing and feed production, which leads to deforestation and conversion of natural grassland to grazing pastures (Alkemade et al., 2013; Pereira et al., 2012; Steinfeld, 2006), insects can be reared in small spaces, making its production the highest land use efficiency (Alexander et al., 2017; Smith et al., 2021). Insects are also generally more efficient at converting feed than livestock, so they require considerably fewer resources for cultivation, such as water, land, and energy. Several lifecycle studies have indicated that insect farming produces significantly fewer greenhouse gases than traditional livestock farming, with reductions ranging from about 45% for mealworms or crickets versus chicken to 88% for mealworms versus beef. These benefits could be even more pronounced if insects were fed non-traditional feedstocks like unused crop residues or food waste (Halloran et al., 2017; Oonincx & De Boer, 2012; Smetana et al., 2015; Smith et al., 2021).

Therefore, on the international level, the practice of eating insects is a whole media front, aiming to raise awareness and promote insect consumption. However, information is sometimes contradictory, and the culture of consuming insects as food has not yet been established. A 2013 United Nations Food and Agriculture Organization report estimated that around 2 billion people worldwide eat insects (van Huis et al., 2013). This figure has been used frequently and has sparked controversy until today, given that it represents a large part of the 7 billion global population in 2013. A recent study by Van Huis et al. (2022) was conducted to verify this, concluding that 2 billion is too many; the actual number would be much smaller and declining. The study also noted the common perception prevalent in countries like Nigeria that views insects as “poor man’s diet”. Therefore, as living standards and incomes improve, the trend of eating insects in these countries decreases, especially among the young populations (Ibitoye et al., 2021).

A recent estimate suggested that the global edible insect market would reach a value of 9.6 billion USD by 2030 (MarketResearch.com, 2022), but this number seems hard to achieve. Consumers have accepted some insect products like ant salt on Amazon and powder protein bars made from crickets available in Swiss grocery stores. In recent years, Western media has often praised the virtues of consuming insects (Beans, 2022). However, for most consumers and households, eating habits cannot be formed/changed with just the availability of information regarding the benefits of eating insects.

The first bite of insect food is very challenging, as Researcher Matthew Ruby (La Trobe University, Australia) asserted (Beans, 2022):

“Getting over the initial disgust of the idea of eating something that is often thought of as dirty and unclean is a big barrier”.

Yet this is also a necessary turning point. Numerous studies have shown that once people genuinely enjoy a dish made from insects, the feeling of disgust quickly diminishes. The main issue is where to find the courage to take that “first bite”.

In the United States, consumers more easily accept the idea of eating cookies containing processed black soldier fly larval flour than eating whole insects (Higa et al., 2021), like being “out of sight, out of mind”. Even for more “appealing” insects like grasshoppers, manufacturers say that putting their images on packaging can negatively affect consumer attitudes. Things only become more accessible after the taste is tried, and the palate is satisfied, giving the dish a good rating. At that point, consumers are more ready to try whole insects (Beans, 2022). The reason lies in the taste: umami. Umami, the fifth taste besides the four basic tastes of saltiness, sweetness, bitterness, and sourness, is described as brothy or meaty.

Despite the nutritional and environmental value of insect food, business-wise, messages like “you should eat more insects because it’s good for you and/or good for the planet” do not tend to have an effect (Beans, 2022). Consumers are persuaded by other factors when changing this type of behavior. One effective method shown through experiments on Amazon Mechanical Turk is to use advertisements featuring beloved stars like Serena Williams, Roger Federer, Ryan Reynolds, Angelina Jolie, etc., which significantly increases the likelihood of viewers being willing to try the product (Park et al., 2022).

However, due to very different psychological factors among the majority of consumers, those who inherently fear and are wary of unfamiliar foods (food neophobia) are unlikely to try, even if they are starving (White et al., 2023). A study by White et al. (2023) also indicates that hunger does not predict the tendency to eat insects. Part of the psychological acceptance of insects is positively affected by the understanding of the insect species, especially regarding the safety and environmental sustainability of this food source (Zugravu et al., 2023). A recent survey in Romania among about 496 participants, mostly women aged 28-50, found that only 6.3% had ever eaten insects, although nearly 44% thought they could (Zugravu et al., 2023). The small proportion of those who had actually eaten insects compared to those who thought they could hint at the crucial roles of information and education level in being open to the ‘first bite’, especially in countries without a tradition of consuming insects. Persuasion depends on regulating factors such as disgust, fear of new foods, familiarity, visual appearance of insects, and taste of the food (Alhujaili et al., 2023).

Additionally, cultural-social settings, including religion, also influence acceptance. For instance, even though India is a Western country, the acceptance rate for eating insects is lower than in the USA (16%) because many believe that religions like Hinduism, Islam, and Christianity do not approve of eating insects, although this is not necessarily true (Alhujaili et al., 2023).

In Vietnam, consuming natural food sources seems less hindered, and eating insects is not unusual. Insects have been consumed widely, not just recently, but have historical roots.

Scientific information about insect eating appeared in Vietnam as early as the beginning of the 20th century, creating foundation for the practice (Vuong, 2023). For both modern agriculture and biology, Vietnam's history recognizes the pioneering contributions of scientist Nguyen Cong Tieu, who introduced nutritional sources from insects at an international forum as early as 1928, nearly a century ago (Tieu, 1928). Tieu was also given 100 Indochinese francs in 1935 to reduce the number of cicadas in Hanoi, as their noise was headache-inducing in the summer (Tieu, 1928). However, no documents indicate Mr. Tieu recommended eating cicadas, even though they are abundant in the early summer months. The second author (of this paper) asked Dr. Pham Gia Minh, Mr. Tieu's grandson, for confirmation, and he replied:

“I don't quite remember about cicadas. But regarding stink bugs, he definitely popularized how to cook and eat them. Our region grows lychees, and there are many stink bugs. He introduced many types of insects, but stink bugs are what I remember the most.”

Today, stir-fried stink bugs with lime leaves are considered a favorite dish among Hanoi's drinkers; no need to refer to the FAO and UN reports.



Figure 1: Stir-fried stink bugs. Retrieved from (Nguyễn, 2018).

Despite the awareness of insects being used as food, Vietnamese people tend to view them as street foods or regional specialties, grilled, crispy fried, butter fried, or mixed with salad, but not as dietary products consumed habitually. In a study conducted with 110 consumers in Ho Chi Minh City, Hoang (2023) discovered that 75% of the respondents knew cricket-based food as street foods or regional specialties. Still, most (62.7% to 68.2%) were

unaware of cricket-processed products, like protein powders, sausages, and burgers. Despite the prior unawareness, a majority of the respondents expressed the acceptance to use those cricket-processed products, with 71%, 65%, and 60% accepting to consume cricket powders, sausages, and burgers, respectively. However, the perception that insects are “poor man’s diet” persists within Vietnamese society, as people with higher incomes are found to be less likely to accept eating cricket-processed products (Hoang, 2023).

Despite many obstacles to consuming insects as food, recommendations and encouragement continue in the face of the fundamental challenges of climate change, population growth, and looming food security threats (Alhujaili et al., 2023; Beans, 2022; Van Huis et al., 2022; Vuong, 2022b). With the UN and the FAO forecasting a global population growth of 9 billion by 2030, they have officially recommended countries consume protein from insects and even planned large-scale insect farming with high nutritional value (United Nations, 2013). Indeed, in the era of climate change and biodiversity loss, insects must not be stereotyped as “poor man’s diet”, and beef should not be referred to as high-class and luxurious. Instead, insect-eating should be considered an expression of the progressive eco-surplus culture, which views environmental healing as a core cultural and humanistic value (Vuong, 2021; Vuong & Nguyen, 2023, 2024).

In many countries, particularly in Western cultures, there is a psychological barrier to accepting insects as a viable food source for humans (Yen, 2015). However, in Vietnam, where the practice of entomophagy has long existed in society, the obstacle is much lower. Thus, the country has a great potential to promote the insect consumption culture more broadly. Meeting food needs in an era of extreme climate is a significant challenge as the human population continues to grow and the environment is increasingly degraded. Reconnecting with the nutritional source from insects, as the scientific information by Nguyen Cong Tieu was published nearly a century ago, is becoming more of a reality.

Nevertheless, on a large scale and to meet the demands of modern consumption, understanding this nutritional source and its potential to become a reliable food source requires increasingly more interdisciplinary scientific information (involving socio-cultural, economic, psychological, and entomological research), which is largely lacking in Vietnam. It must also be noted that cooking insects to ensure safety, hygiene, and food safety standards is a serious task to prevent poisoning and allergies for consumers. Products in the above studies all consider safety, hygiene, and nutrition as basic, minimal conditions to meet before being marketed.

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