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Food, Culture & Society
An International Journal of Multidisciplinary Research

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rffc20

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To cite this article: Ingvar Svanberg & Åsa Berggren (2021) Insects as past and future food in entomophobic Europe, Food, Culture & Society, 24:5, 624-638, DOI: 10.1080/15528014.2021.1882170

To link to this article: https://doi.org/10.1080/15528014.2021.1882170

Published online: 16 Mar 2021.

FOOD, CULTURE & SOCIETY
2021, VOL. 24, NO. 5, 624–638
https://doi.org/10.1080/15528014.2021.1882170

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Insects as past and future food in entomophobic Europe

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ABSTRACT

Insects as food show a large variation in traditional use over the world. This high variation between countries in combination with current ideas of insects as part of a solution to feed a growing global population raises interesting questions. The aim of this paper is to investigate what has been perceived as food historically and how this changes over time with focus on insects. Insects and their products have been used for food and medicine within and outside Europe for as long as we have records. They have not been a staple food but a rare addition to the diet. The frequency of use in Europe, even in times of food crisis, points to reluctance towards this food source. Based on behavioral history and perception of insects as food we suggest the terms entomophobic (insect despising) and entomophilic (insect loving) to describe the eating behavior of societies. If societies are to change their food consumption patterns, new food habits and traditions needs to be created. Altering a predominantly entomophobic society to an entomophilic, changes are needed to take place and many are linked to consumption tradition. Change is likely; history teaches us that aversion to ingredients is possible to overcome.

KEYWORDS

Entomophagy; ethnozoology; food change; food-cultural studies; future food; gastroculture; nutritional anthropology

1 Introduction

The increasing globalization with easier access to a wide array of raw material has been important in contemporary dietary change. In later years, innovations in food consumption have been adopted faster than ever (Tellström 2015). Food culture is a process that transforms the edible raw ingredient into a more advanced and value-added product and eating situation. During the last few decades, the food culture of the Swedish population has become increasingly global. For instance, kebab, pizza, falafel, halloumi, chia seeds, quinoa, sushi, exotic fruits and vegetables, oumph, tofu, and various vegan and vegetarian dishes have become everyday food (Tellström 2015).

Late modern food includes many substances the consumers cannot identify or recognize (Nilsson 2007). At the same time, many locally available biological resources have disappeared from European cuisines, including the Swedish, because of changing preferences and culturally defined tastes (Eidlitz 1969; Lundberg, von Proschwitz, and Svanberg 2010; Babai, Avar, and Ulicsni 2016). Many freshwater fish species, especially cyprinids, which were still readily eaten in the 1950s, have disappeared entirely from the

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Swedish cuisine (Bonow and Svanberg 2013). Dishes made of intestines and blood are disappearing in Swedish food culture (Jansson and Lindberg 2015). Tastes are culturally shaped and may nowadays vary within social groups or even families. Current statistics of food consumption in Sweden indicates dietary changes and preferred foodstuffs. The consumption of staple food such as flour, milk, potatoes, and sugar has decreased the last fifty years, while processed food such as industrially produced bread, candies, cheese, chocolates, ciders, French fries, soda water, jam and ready-to-serve food has increased. Meat consumption has increased dramatically, the consumption of vegetables has doubled since 1980, and fast food is everyday meals at the same time as veganism and vegetarianism are becoming popular (Sveriges Officiella Statistik 2018).

1.2. Aim and sources

The purpose of this paper is to investigate what historically has been perceived as food and how this changes over time, particularly in Sweden. Especially insects as edible foodstuff is discussed. Our approach is from a cultural perspective in a wide sense (Ashley et al. 2004; Fjellström 2009). A thorough review of various historical sources (ethnographical reports, Swedish folklore archives, local history, food research) has been conducted in order to find data of earlier use of insects as food in Europe and Sweden (cf. Svanberg and Berggren 2018, 2019). In addition, a review of food change studies relevant for the study has been carried out (Nelson and Svanberg 1987; Svanberg and Lindh 2019).

2. Insects as a new food source

A recent change in the food area is the current focus on insects as a food source. It has been highlighted as a solution to the vast need for proteins and other nutrients for a growing global population. Over the last few years, this idea has gained momentum, and business initiatives focused on supplying insect-based food have started in several countries (Berggren, Jansson, and Low 2018). It has long been well known that insects are regarded as food in many cultures, although insects have never been the staple food. About 80% of the world's nations consume insects in some kind (Liholt 2015), and over 2,000 insect species are eaten worldwide (Mitsuhashi 2017). For many countries, insects as part of the cuisine are likely to be perceived as a novelty, depending on the traditions of the society. The advocated establishment of insects as food is therefore partly dependent on the ethnobiological history of the society.

3. Entomophagy – A solution for the future?

Human beings have a long history of interactions with insects stretching many thousand years back (Sutton 1995; Van Itterbeeck and van Huis 2012). Many kinds of bio-cultural domains have developed in these activity contexts, reflecting economic needs, health aspects, socio-cultural importance, and symbolic values. Insects as a source of nutrients are one important bio-cultural domain (Posey 2002; Sabah et al. 2004; Kujawska, Zamudio, and Hilgert 2012; Ulicsni, Svanberg, and Molnár 2016).

The suggestion that human beings should eat insects (entomophagy) is not new and has been raised before (De Foliart 1997). In the nineteenth century, at least one author considered it as a good food source for people in the European societies. In 1885, Vincent M. Holt published a small manifesto entitled "Why not eat insects?" The author lists a number of insects in Great Britain that would be suitable as food (Holt 1885). More recently, the United Nation's Food and Agriculture Organization (FAO) has promoted insects as food. The organization maintains that insects will provide food in a world where current food production and agricultural systems will not be sufficient (FAO 2013). Another motivation for entomophagy to be more general is the belief that mass rearing of insects will consume fewer resources (e.g., energy and water) than current agricultural practises. Insects are also good at converting the feed they eat to body growth (and thereby protein for consumers), and a high percentage of the insect is edible (Nakagaki and DeFoliart 1991; Miech et al. 2017). Even with the factors above, the realized sustainability of a new insect-based food system will be very dependent on that key ecological factors are involved in developing the systems (Berggren, Jansson, and Low 2019).

Several assessments have been carried out so far on the nutritive value of different insect species. The number of species studied is very small compared to the more than 2–3 million insect species estimated in the world (Speight, Hunter, and Watt 2008). The studies have shown that protein and fat contents are high, and that the quality of the proteins and fatty acids are high and suitable for humans (Finke 2005; Rumpold and Schlüter 2013; Makkar et al. 2014). Many insects also contain minerals and vitamins valuable to humans, such as iron, copper, and magnesium (Rumpold and Schlüter 2013). The findings indicate that there are insect species that would be suitable for both adults and children as sources of nutrition. A recent study on pigs, which are often used as a model for humans in nutrition studies, show that they grew better fed crickets than standard feed (Miech et al. 2017). Chitin is an important part of the exoskeleton of insects and is present in different amounts in adult individuals. Questions have been raised about the effect of chitin on humans and if humans are able to utilize it. Enzymes that break down chitin have been found in human gastric juices and indicate that humans might be able to break down this compound (Paoletti et al. 2007). The basis of a food source that is suitable and useful for humans seems therefore to be present.

Currently, we utilize about 70% of our agricultural land to feed animals that we in turn eat. In other words, plants that we ourselves could eat we give as fodder to domestic food-producing livestock and poultry (FAO 2006). Many economists, nutritional experts, and future strategists advocate that people in Western Europe and North America should eat insects also as a way to sustainable manage our resources. This is becoming acute with an increasing world population, which surpassed 7.6 billion in 2018. A new food culture is necessary to feed all these people and future generations (Tilman et al. 2011).

3. 1. Traditional entomophagy in a global perspective

The scientific interests in entomophagy in various cultures have a long tradition among scholars. The Roman author Pliny the Elder mentions in his *Naturalis Historia* (AD 77) a certain group of Ethiopians as locust eaters (Pliny the Elder 1969). Carl Linnaeus refers in his zoological lectures in the 1740s to a few examples of using insects, such as products

of bees, bumblebees, and ants (Lönnberg 1913). He was of course aware of the passages in the Bible of insects as food. In Leviticus (11:22) the Jews were said to be permitted to eat "the locust of any kind, the bald locust of any kind, the cricket of any kind, and the grasshopper of any kind". In Matthew (3:4), the story about John the Baptist whose "food was locusts and wild honey" has fascinated the academic world, including Linnaeus and his contemporaries. When Linnaeus sent out his pupil Frederic Hasselquist to the Ottoman Empire, he was commissioned to investigate whether the locals in the Levant and Egypt still consumed locusts as food. Hasselquist confirmed it reporting "that roasted locusts are at this time eaten by the Arabs" (Hasselquist 1752, our translation). Another Linnaean pupil, Bengt Bergius, compiled an enormous amount of encyclopedic knowledge regarding human food from literature sources. His work published posthumously in Swedish 1785–86 and translated into German in 1797, deals at length with insects as food, including ants, cicadidae, larvae of beetles, locusts, and termites (Bergius 1797).

Entomophagy exists as everyday normal food, survival food, medicinal food, ritual food, and accidental food (Silow 1976; Sutton 1995; Posey 2002; Das 2020). More recently, many ethnobiological studies focus on insects as food in Asia, Latin America, and Sub-Saharan Africa (e.g., Posey 1986; Nishimune et al. 2000; Morris 2008; Cerritos and Klewer 2015; van Huis 2017a; Das 2020). There are many evidences from Siberia and Russian Far East that the natives consumed insects (Lévi-Strauss 1962). In the Arctic regions of Greenland, Nunavut, and Alaska, insects were usually not eaten by Inuit hunters with exception for a larva, *Hypoderma tarandi* L. that live under the skin of the caribou (Laugrand and Oosten 2016).

3.2 Entomophagy in Europe

There is no reason to believe that European peasants and herders differed from native societies in other parts of the world regarding their ecological knowledge (Lévi-Strauss 1962). Although herders and peasants in traditional Europe had a vast knowledge of the biota including invertebrates, the folk knowledge and use of insects is very little researched (Svanberg et al. 2011). As a result, information about European folk knowledge of the wild invertebrate fauna, including their use in healing and nutrition, is scarce. As in other cultures around the world, some insects were appreciated, others disliked or even feared, and some were utilized for various purposes (Brøndegaard 1985; Ulicsni, Svanberg, and Molnár 2016). The Spanish fly, *Lytta vesicatoria* L., for instance, has been widely used in folk medicine and for increasing sexual pleasure in many parts of Europe (Sandroni 2000; Łuczaj 2005; Stokker 2007; Ulicsni, Svanberg, and Molnár 2016).

Only a few ethnographical studies mention edibleness in relation to insects. Of course, people swallowed some insects by accident, for example while eating bread, raspberries, or other foods. This is rarely documented in any sources. The custom of eating head lice, *Pediculus humanus capitis* De Geer, 1778, is known from many cultures outside Europe (Orton 1870; Lévi-Strauss 1955; Scott 1991; Łuczaj 2005). This has been done in many parts of Europe as well, although it is very little documented (Bodenheimer 1951; cf. Mitsuhashi 2017; Tillhagen 1958). There are reports that head lice were used as medicine in Spain and among Hungarians in Romania (Overstreet 2003; Vallejo and González 2013; Ulicsni *in litt.*). There is some evidence of humans eating cockchafers (*Melolontha*), especially as famine food, and in certain areas of Romania, Italy, and Ireland, children

reportedly have eaten this insect genus (Bodenheimer 1951; Łuczaj 2005). Salted or smoked grasshoppers were eaten in Russia and by the Tatars in Crimea until the nineteenth century (Bodenheimer 1951). In the nineteenth century, locusts were eaten as food in southern France (Cowan 1865). People in Wallachia and Moldavia have eaten adult scarab beetles, *Amphimallon pini* (Ol.), while the peasants in Lombardy have used the beetle, *Rhizotrogus assimilis* (Herbst), as food (Mitsuhashi 2017).

Galls of the ground ivy, *Glechoma hederacea* L., which are produced by the *Cynips glechoma* L., have been eaten in France (Cowan 1865). On Crete, inhabitants gathered the very juicy galls of sage (*Salvia* spp.) for food. Collecting them at the beginning of May, the people of Chania also sold them to neighboring villagers (Fagan 1918). The galls, which were caused by *Aulax* sp., were esteemed for their aromatic and acid flavors. They were used locally, but also formed a considerable trade product in the eastern Mediterranean region (Fagan 1918). A local traditional habit for children in the historical-geographical region of Carnia in northeastern Italy is eating the sweet ingluvies (the crop) from day-flying moths of the genus *Zygaena* and its mimic, the moth *Amata phegea* (L.) (Zagrobelny et al. 2009). Hungarians in Central Europe have consumed the honey stomachs of black-colored carpenter bees, *Xylocopa* spp. (Ulicsni, Svanberg, and Molnár 2016). Hungarian children also used to harvest sweet paste from the reed nests made by solitary bees, *Hoplitis adunca* (Panz 1798) (Ulicsni, Svanberg, and Molnár 2016) on thatched roofs of local houses. Harvesting products from wild honeybees is one of the most ancient human activities and has existed until recently among Slavic and other peoples of Eastern Europe (Bodenheimer 1951; Moszyński 1967). Honey and beeswax from the domestic European honeybee, *Apis mellifera* L., have been eaten in many parts of Europe (Crane 1999; Finke 2005).

An interesting bio-cultural domain that has developed in the human-insect relationship is the case of *casu marzu*, the traditional Sardinian cheese. The cheese is a result of a decomposition process caused by the larvae of the cheese fly, *Piophila casei* (L.). The cheese is usually eaten when the larvae are still alive. However, casu marzu was banned by the European Union because of food hygiene regulations. Nonetheless, this ban is ignored and several local varieties of the cheese are matured with the help of the cheese fly (Overstreet 2003).

3.3 Historical entomophagy in Sweden

Very few examples of insect eating have been recorded from northern Europe (Brøndegaard 1985; Meyer-Rochov 2008). There is some evidence that Swedes consumed ants (Svanberg and Berggren 2019). Ants can be used as both food and medicine. Red wood ants, *Formica rufa* L., and the formic acid they produce were much used in folk medicine in Sweden (Tillhagen 1958). Ant schnapps (Swedish *myrbränvin*), i.e., spirits flavored with formic acid, has a long tradition, both as a remedy and as a drink enjoyed for its taste. It is mentioned in a pharmacy list from 1698 as Spiritus formicarum. The Swedish poet Carl Mikael Bellman (1740–1795) refers to ant liquor in his poetry (e.g., Bellman 1921). Ant schnapps is still homemade by individuals interested in flavoring their own schnapps (Svanberg and Berggren 2019).

As in other parts of Europe, apiculture has a long tradition in Sweden. The European honeybee, *Apis mellifera* L. has been kept as a domestic animal by the peasantry in

southern and central Sweden. Bee products, especially honey, brood, and beeswax, have been important since at least medieval times (Sandklef 1946; Husberg 1996). A minor insect product, bumblebee 'honey', has been eaten as a sweet or for health reason in Sweden as well in other parts of Europe: Denmark, Iceland, Finland, Estonia, Germany, and Romania (Svanberg and Berggren 2018). The bumblebees gather and store the nectar in their nests, which were collected by children (Brøndegaard 1985; Crane 1972; Viktor Ulicsni, *in litt.*). It was certainly an important sweet substance before apiculture was introduced with the arrival of Christianity in the Nordic countries (Svanberg and Berggren 2018).

Several insects have also been part of the pharmacopeia in pre-industrial Sweden and other Scandinavian countries (and probably in most other European countries), e.g., remedies and tinctures made of *Lucanus cervus* (L.) (stag beetle), *Lytta vesicatoria* (L.) (Spanish fly), *Dactylopius coccus* Costa (cochineal), *Kermes ilicis* (L.) (kermes), *Bombyx mori* L. (silk worm), *Apis mellifera* L. (honey bee), *Formica rufa* L. (red wood ant), *Cynips quercusfolii* L. (oak gall wasp) and *Diplolepis rosae* (L.) (bedeguar) (Linnaeus 1750). Spanish fly and bee products were available in Swedish pharmacies still in the end of the nineteenth century (Rosendahl 1897).

3.5 New food for the future

Many new kinds of foods are presently challenging Swedish food culture: exotic vegetables, seaweed, vegetable-based meat substitutes, GMO-cereals, insects, and more. In several studies performed on the attitudes of Europeans from different countries, many report a reluctance to eat insects or insect products (Zielińska et al. 2018; Sogari, Liu, and Li 2019). The studies show a variation in attitudes, but have in common a hesitant view of incorporating insects in their diets.

However, we have presently a new situation with insect food ready to be distributed in society. Producers of insect-based foods are established and wait for a wider legal approval of insects as food. These are mainly small food-tech companies that farm insects (mealworms, crickets) under food safety regimes, but these are currently sold as pet food. Chiefs have showed interest to create dishes from these that can fit today's urban consumers. In neighboring Denmark, insects are already served at some restaurants in the upper end of fine cooking. In Sweden, in 2020, the media has shown great interest in insects as future food. At the moment, we do not know how consumers will react and respond. It is likely a long way to go before we can talk about changing attitudes and norms.

4. Factors affecting food acceptance

A broad range of physical, political, and economic factors influence food choices, including values and morals (Pelto 1981). Food habits can be changed through argumentation, debate, legislation, and economic policy (Nelson 1988; Svanberg and Nelson 1992). However, the factors affecting the acceptance or rejection of foods are complex (McIntosh 1996). Anthropologist Paul Fieldhouse has explored the concepts of food availability and acceptability and their respective components. He regarded availability as comprised of physical, political, and economic factors, while he saw acceptability as

made up of a hierarchy of cultural, religious, and socio-psychological factors, with the rather ambiguous category, individual choice, functioning as the final factor (Fieldhouse 1986). Food acceptance is also a question of psychological factors. Rozin and Fallon (1987) suggest three factors to consider in attempting understanding the rejection of food: flavor, an affective negative response (part of which may be regarded as distaste, disgust, and potential danger), and "cultural ideational mediation", which is a learned or social response. Rozin and Vollmecke (1986) point out that genetics play a role in innate food biases, ambivalent responses to potential foods (interests vs. fear of toxins), and the ability to alter preferences due to delayed consequences such as illness. Still, drawing the line between genetic and learned food behavior is difficult, and preferences, likes, and dislikes are not always decisive in the rejection of food, i.e., the other factors may come into play. Thus while it is apparent that there are certain physical and psychological reasons for food rejection, the question inherently moves into the social realm (Svanberg and Nelson 1992).

The product of individual's choices can create societies where the attitude toward certain foodstuffs is generally the same (Pelto 1981). Societies can embrace some items or regard them as non-edible. In an analogy with the ethnobiologists' concepts of *mycophobous* and *mycophilous* societies and *herbophobous* and *herbophilous* cultures (Lévi-Strauss 1970; Łuczaj 2010; Łuczaj and Pieroni 2016), we hereby suggest that societies can be termed to be in general *entomophobous* or *entomophilous*. Using these terms, Europe (including Sweden) belongs to the earlier kind, while many countries outside Europe belong to the latter.

4.1 Changes over time: Sweden as an example

Although insects have a long history of cultural and medicinal importance, they have had very limited use as food in Europe. In general, the people of the Nordic countries, including Sweden, have rejected insects as food, although some insect products (honey, ant schnapps) have been culturally accepted in pre-industrial Sweden. Food crises in connection with bad harvests forced the peasantry to use famine food, usually wild plants and bark (phloem) which were seldom used otherwise (Svanberg 2012). Items that one could expect as food substitutes were not used, e.g., lichens, mushrooms, rodents, insects, and most other invertebrates (Nelson and Svanberg 1987; Svanberg and Nelson 1992). Just as lichens or mushrooms were not culturally acceptable as food for the peasantry, insects were not considered as possible food, even at times of food shortage.

With the industrialization, modernization, and urbanization of Sweden from the 1880s and onwards, the dietary habits of the majority of the population changed dramatically. Dishes prepared with horsemeat that were previously taboo began to be accepted during the early twentieth century (Egardt 1970), as did other disliked foods such as fungi, many fish species, crayfish, and various shellfish, etc. (Berg 1968; Svanberg and Lindh 2019). Additionally, many new food products were introduced into the national cuisine. Changes in personal finance, food production, distribution of food products, and increasing internationalization (including globalization and immigration) have affected food culture tremendously (Bringéus 2001; Ashley et al. 2004). The last few decades have seen dramatic changes in people's consumption patterns and diets (Ekelund and Jönsson 2011; Tellström 2015; Sveriges Officiella Statistik).

Today food culture is no longer a question of survival. Nowadays consumers in late modern Sweden are very conscious about their diet. There are many foods to choose

between, and those food choices express individual and social identities in a way that was not possible a hundred or even fifty years ago. Contemporary Swedes demand variety when it comes to food culture. For adults, a proper meal is still important in contrast to "fast food"; it is more than just a question of fuel and nutrition (Fjellström 2009).

The cultural aspect of food is an important part of the identity for late modern Swedes (Tellström 2015). Many people are curious to try new foods; others prefer what they regard as the old-fashioned food they ate when they were young. Some people choose to abstain from eating certain specific foods for ethical or ideological reasons. Many popular fad diets come and go in contemporary Sweden (Mann and Nye 2009). New staples have replaced traditionally accepted ones in the mainstream diet; industrially produced foods have become more available; and fast food stands and restaurants are commonplace. Food is part of the contemporary lifestyle and many people in Sweden are open-minded about accepting new food items. Scandinavian cuisine is a newly established concept within gastronomy and includes ingredients from forests, freshwater lakes, and the sea (Tellström 2015).

Late modern Swedes are now eating a lot of food that was hardly regarded as edible a hundred years ago. Many people take a cultural relativism approach toward food. They are curious and willing to try new edibles. It is of course depending on factors such as class, ethnicity, educational level, gender, personality, and urbanity (Tellström 2015). However, entomophagy is still a challenge. Will it be possible to introduce insect-based foodstuffs in the near future? Ethnologist Tellström (2015) predicts that we will change our food habits very radically within the near future due to climate, demographic and technological changes. Some people from Sweden do eat insects when traveling to Southeast Asia, though usually out of curiosity. It has also become increasingly common to over Internet import insect products like freeze-dried grasshoppers or cricket-powder (Asst. Prof. Mikael Björling, *in litt.*).

5. Discussion

5.1 Entomophobic vs entomophilic societies

When discussing traditions and human behavior within societies, generalizations of the dominating features may help to analyze and understand both similarities and differences (Ingold 2007). In classifying societies as either entomophobic or entomophilic we link the tradition of using insects as food to other food traditions previously described in the literature (such as mycophobia/mycophilia, herbophobia/herbophilia). Similar drivers as for other potential food items may be the reason why societies become phobic or philic, and give us clues to how changes develop over time (Nelson and Svanberg 1987, 1993; Łuczaj and Pieroni 2016).

5.2 Changing a phobia to a philia

In the transformation of a dominantly entomophobic society into an entomophilic one, several changes are needed that work independently as well as together. For new food sources, we must incorporate what Arne Oshaug (1985) regards as food norms and endurance. A food norm is made up of three components: nutritional adequacy, cultural acceptability, and human dignity. When these three criteria are fulfilled and

infrastructures have been developed that are necessary to maintain the food norm, the establishment of the new food has been achieved (Oshaug 1985: Svanberg and Nelson 1992). The nature and processes involved in change can be described in different ways (e.g., Pelto 1981; Looy and Wood 2015; Shelomi 2016; Schlup and Brunner 2018, Sogari, Liu, and Li 2019). For the purpose of discussion, we divide them into four broad categories: 1) laws and regulations, 2) societal influence, 3) insects suitable to consume, and 4) human biological and sociological factors. In all these, the tradition of eating insects plays an important part (Figure 1).

Currently, EU laws are quite strict on allowing insects as food. For an insect species to be allowed to be sold as food, an application to the EU's food safety authority (EFSA) needs to be approved (EU 2015, 2017). This is not the case if the species has been eaten within the country traditionally. During a transitional period, it has been possible for the EU Member States to regulate the insect-as-food market within their territory (Grmelova and Sedimidubsky 2017). This situation has created an uneven development and release of insect food products between EU's member countries. For nonmembers, their own national food authorities regulate the legal and regulatory aspects of insect food products. Governmental authorities inform their citizens to a varying degree on the benefits and risks of different foods. In some countries, this has little impact on people's food choices, while in others, governments influence the individual decision-making (Henson and Caswell 1999). It is likely that in some countries, governmental approval and information about insects as food (including potential risks) would make

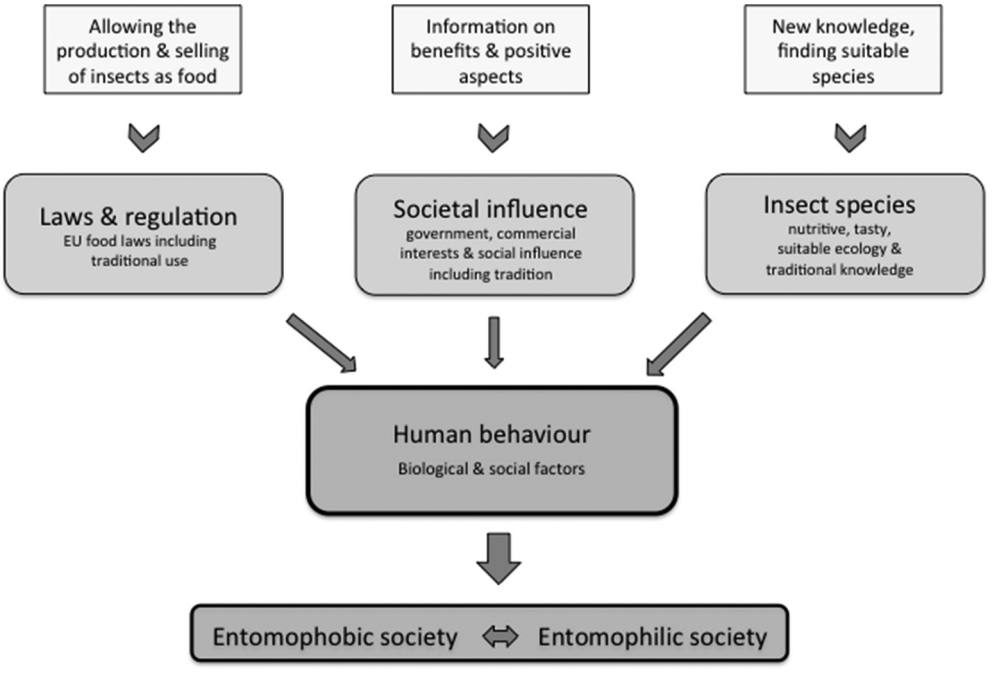

Figure 1. Societal and biological factors influencing the behavior of societies decide the shift from entomophobic to entomophilic. Traditional use of insects is an important factor for the outcome of the change.

parts of the population more inclined to eat insects. To be consumed, insect products have to be available in the market (Sogari et al. 2019). Commercial forces make food products accessible to consumers as well as help to increase consumers' attraction to the products (Shelomi 2016). Currently, companies focused on large-scale rearing of insects are being developed in many European countries, and the future economical prospects of this sector are believed to be very positive (van Huis and Tomberlin 2017). Since social influence has a strong effect on food choice, it is possible that the local tradition of using insects as food will affect the decision process of individuals. At present, different insect species are used in the rearing facilities in Europe, but the number of species is small, only around four (van Huis and Tomberlin 2017). To successfully rear insects as food that will appeal to consumers, matters such as taste, food safety, insect health and welfare, and nutritive values are likely to be important. So far, much of this information is lacking. In fact, little is known about insects as food from most points of view although the research field is growing (van Huis 2017b; Berggren, Jansson, and Low 2019). It is likely that a vast number of insect species can be eaten and that would be true also for the native species of Europe. Ideas as to which species might be suitable could be taken from historical sources, and ethnographical studies of local and regional uses.

A change of societies from entomophobic to entomophilic is likely to be successful when influential parties aid the changes necessary. In the Netherlands efforts from government, research facilities, and businesses have shifted people's attitudes and created a stable consumer base for insect food products (Shelomi 2016). This recent transformation of an entomophobic country, indicate that such societal flips in attitude can be achieved. This signals that there are possibilities that human behaviors can change on a large scale over a relatively short time, and gives hope for efforts toward more sustainable and secure food systems.

6. Conclusion

Ethnographical and historical sources show that insects have been regarded as good food (and snacks) in many parts of the world. However, in Europe, insects have been a marginal food item, and their use have differed between countries. Now the interest for insects as food is changing. It is seen as a future food with great potential. For insects to be part of the diet, laws will need to be enacted to permit people to eat them, and sound practical aspects around insect rearing will need to be developed. At the same time, encouragement from external parties may help change a society that now is entomophobic to become entomophilic. Presently there is no lack of protein-rich food sources in the Nordic countries. On the contrary, we eat too much protein according to some nutritional experts. With an increasing global population, this may change in the near future and with that our need to use the resources of the planet sustainably. Already we can include insects in our food culture. Whether it is tasty or not is completely dependent on food creators' ability to develop not only nutritious but also tasteful food. Swedes are already used to highly processed food on a daily basis. The history teaches us that aversions to certain nutrients and raw material is easy to overcome.

Acknowledgments

The authors would like to thank researcher Viktor Ulicsni, MTA Centre for Ecology Research, Hungary, for providing further information on insect eating in Southern Europe. This research was supported by the Institute for Russian and Eurasian Studies, Uppsala University to ISv, and the Faculty of Natural Resources and Agricultural Sciences, Swedish University of Agricultural Sciences to ÅB. We would also like to thank the two anonymous referees for their helpful comments on earlier drafts of this paper.

Disclosure statement

No potential conflict of interest was reported by the authors.

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