

## What if insects were on the menu in Europe?

Insects, while commonly consumed elsewhere in the world, have long been off the menu in Europe, but they could soon be creeping their way onto our plates. Entomophagy, the practice of eating insects, is now gaining serious interest. Is it set to take Europe by swarm?

Insects are the most diverse group of organisms on the planet and over 1 000 different species are regularly eaten in Africa, Asia, and Central and South America. Nutritionally dense and versatile, insects are already available for human consumption in some EU Member States, either sold whole or in processed products.

With the EU committed to transitioning to a more sustainable and resilient food system as part of the European Green Deal and in light of the Covid-19 pandemic, insects could offer a greener alternative component of future animal protein production. EU legislation has recently had to catch up with entomophagy's expansion from a niche novelty to serious commercial and culinary contender, with further legislative authorisation anticipated.



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### Potential impacts and developments

Insects could make a healthy addition to European diets, generally being a [rich source](#) of proteins, fats, minerals (particularly calcium, iron and zinc), and vitamins (including vitamin C and B vitamins). Many insects reportedly taste good and are even considered delicacies in some cultures. Otherwise, insects can be ground or their nutrients extracted and mixed with other foodstuffs, such as grains or meat, to enhance the quality of processed products such as burgers, pasta, cereal bars, and cakes. However, potential risks are associated with the consumption of insects. Some species contain body parts that are difficult to digest, such as cricket spines and legs, and eating inappropriate species or developmental stages could lead to the inadvertent ingestion of toxic substances. Chitin, an abundant biopolymer that makes up the exoskeletons of insects, is a known allergen.

Insects are not yet routinely eaten in most European diets and are subject to strong cultural responses of dislike and disgust, as well as perceptions as a primitive foodstuff. However, the rejection of entomophagy has been shown to be a [learned behaviour](#) and overcoming this cultural bias would therefore be feasible for Europeans. Indeed, other arthropods, mostly crustaceans, as well as other invertebrates such as molluscs, are already widely eaten across the continent, with many deemed prized delicacies. Farmed insect species would be herbivorous and thus objectively more hygienic than omnivorous crustaceans, while insects ground and added to other foodstuffs are more likely to be [palatable](#) to a wider public, allowing people to overcome food neophobia (fear of unfamiliar foods).

Globally, the most commonly consumed insects are the immature developmental stages of species of beetle, butterflies and moths, and ants, bees and wasps. Elsewhere in the world, mostly wild insects are [harvested](#) for consumption, but this would not be feasible in Europe on a large scale due to the lack of an appropriate species in sufficient abundance, as well as a pesticide contamination risk. Insect farming is already practiced in Europe for the production of those used in laboratory research, aquaculture, as pet and zoo feed, and for human consumption. Silk worms and honey bees have also long been reared in Europe for their valued by-products. Representatives of the insect sector estimate that [6 000 tonnes](#) are currently produced annually in Europe, and expect this to grow to between 3 and 5 million tonnes by 2030.

Insect species with life history traits ideal for [breeding](#) in Europe for human consumption include native species such as the house cricket *Acheta domestica*, *Tenebrio molitor* beetle larvae (mealworms), and honey bees *Apis mellifera*; selective breeding could produce domesticated strains with desired traits conducive to large-scale

breeding. Nevertheless, breeding would likely have to be highly automated to produce sufficiently large quantities of insects for commercial viability.

The [European Green Deal](#) strives for climate-neutrality by 2050, and the [Farm to Fork Strategy](#) focuses on the transition to sustainable agriculture as an integral component of this goal, with the latter highlighting the urgency for a more resilient food system in light of the Covid-19 pandemic. Agriculture is responsible for 10.3 % of EU greenhouse gas emissions, 70 % of which come from animal production, a sector which accounts for 68 % of EU agricultural land use. Meanwhile, EU animal protein [demand](#) is expected to grow in the next decade. Although the projected growth in insect production and consumption will not suffice to meet this demand (nor wholly replace traditional meat), it could play a role in the transition to a more sustainable, robust food system. Naturally occurring in aggregated masses and possessing rapid life-cycles with high fecundity rates, insects could be bred more efficiently than conventional animal livestock, requiring less land, water and energy. Research indicates that they are generally higher in protein content than other traditional sources of protein, such as [meat, dairy products, some seeds](#) and [soybeans](#), and that this protein is of high quality. Most insects are more efficient at [converting](#) feed to edible body mass: crickets for example require six times less feed than cows, four times less than sheep, and half that needed by pigs and chickens to produce roughly the same amount of protein.

Furthermore, insect species naturally consume organic waste materials, offering the potential for circular production. The majority of insects do not produce methane, and greenhouse gas emissions and ammonia production in their rearing would likely be low. Insects could also be used as feed for other animal livestock, being natural components of the diets of pigs, poultry and fish, potentially reducing EU agricultural dependency on other more environmentally destructive feed materials, such as soya and fish meal.

There are limitations and risks to the mass-farming of insects. Firstly, they are cold-blooded, and would therefore require maintained thermal conditions, particularly in colder climates. Insect species and their various developmental stages are subject to many pathologies and would be vulnerable to infectious diseases that are inherently involved with producing animals in high densities. The risk of [novel zoonotic transmission](#) of diseases from insect to human is relatively low, but insects can act as vectors for certain pathogens. Invasive alien species are a main driving force behind biodiversity loss and can cause wider economic damage, and being resilient and with rapid life-cycles, escaped insects could be especially effective invaders.

## Anticipatory policy-making

Insects are subject to the [EU Novel Food Regulation](#), which stipulates that food products, that 'have not been [consumed](#) to a significant degree' in the EU before 1997, must be safe and properly labelled if they are to receive pre-market authorisation. The European Food Safety Authority (EFSA) is set to make a ruling in mid-2020 on the final authorisation of several insects as novel foods, including mealworms, grasshoppers and crickets. Clarification on the legal status of the import and export of insect products will also likely be required. The EU currently protects certain designations used for the [marketing](#) of specific foods of animal origin and so clarification on whether such designations can or cannot be applied to insect products may be necessary.

Insect production is also subject to [legislation](#) regarding animal health and transmissible diseases: insects may not be reared on certain organic waste and may not be [used as feed](#) for certain livestock, but may be used as feed for fish in aquaculture and pets. Given the potential of insects as part of a circular economy due to their ability to convert waste into edible animal protein, this legislation is likely to be reviewed, with the European Commission specifically mentioning insects in its [commitment](#) to explore alternative feed sources.

Current [legislation](#) protecting animal livestock welfare, pertaining to husbandry, transport and slaughter, does not cover insects. Future EU policy may have to bridge the gap in response to growing production (not least because higher welfare standards confer greater levels of hygiene and quality), with consideration given to the attributes unique to insects. While insects do respond to harmful stimuli, whether they possess the neural capacity to experience pain as perceived by higher animals has yet to be ascertained.

Stringent safeguarding would be needed to mitigate risks of accidental escape of potentially invasive and alien species. The EU currently [recognises](#) one species of non-European insect, the Asian hornet, as invasive, alongside three other species that are native to one part of the Union, but alien and potentially invasive in others. These species should not be used in any insect production and the list should be regularly updated to account for novel invasive threats.

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