

# Lovely grub

The insect farming industry has been steadily growing for many years, and insects look set to be a key food source of the future.

Although many Western countries do not have a history of eating insects, entomophagy is common globally – it is estimated that some two billion people include insects as part of their diet. With the world's population rapidly expanding – it is expected to reach 9.7 billion by 2050, up from 7.7 billion today, according to the UN – food consumption will also grow exponentially. The Food and Agriculture Organization of the United Nations (FAO) projects that food production will need to increase by 70% to meet the needs of the population. This is where insects come in.

Insects have a far smaller environmental footprint than traditionally farmed animals such as pigs, cows and poultry, as they require less water, feed and land. According to the FAO, crickets require 1.7kg of feed per 1kg of live animal weight – this compares with the 10kg required by beef, 5kg for pork and 2.5kg for chicken.

## The bee's knees

Livestock production accounts for 70% of all agricultural land use; insect farming, which requires far less space, would free up a significant amount of land and potentially slow deforestation. And according to a study by Oonincx et al., mealworms, crickets and locusts produce greenhouse gas emissions lower by a factor of 100 compared with pigs and beef cattle.

According to the International Platform of Insects for Food and Feed (IPIFF), in 2019 European countries sold 500 tonnes of insect-based food, and IPIFF projects that production will jump to 260,000 tonnes by 2030. In 2020, French mealworm producer Ynsect's total series C funding reached US\$372 million, and the UK government announced £10 million in backing to a black soldier fly demonstrator farm.

“If you look at the industry over the past 10 years, it has been growing enormously,” says Arnold van Huis, Professor of Tropical Entomology at Wageningen University in the Netherlands. “If you take the black soldier fly, for instance, one of the insects used in animal feed, in the past two years there have been more publications on it than in the entire 40-year prior period.”

## Making a meal of it

Insects are being used both in animal feed and in products for human consumption. Alan Hernández Álvarez, a Lecturer in Nutrition and Global Health at the University of Leeds, says that at present the real growth area is in the use of insects for animal feed, “mostly for poultry and fish, as legislation is more straightforward than for their use for human consumption.”

AgriProtein, an agricultural and biotechnology company founded in 2008 by Jason Drew, is one of the companies leading the way in insect farming. It upcycles food waste into sustainable insect protein for livestock, aquaculture and pet feed, and in 2018 raised US\$105 million in funding, the largest such sum in the insect farming sector at that time.

Today, it has a presence in nine countries. “In the early days of this industry people certainly thought the concept very odd, but quickly understood that this is a natural process that has been going on for hundreds of millions of years,” says Drew. “The world is long on waste and short on protein – this is a natural technology that once industrialised can bridge this gap.”

AgriProtein takes in organic waste that would otherwise go to landfill and hatches fly eggs in it. These grow into larvae, leaving behind compost. The larvae themselves are separated into two feed ingredients: a protein powder and an oil. AgriProtein's factories can each process at least 350 tonnes of food waste per day. “The industry is still in its infancy,” says Drew. “Given its capital-intensive nature, doubtless some larger global players will emerge.”

“The industry has made enormous progress and there are other areas which have not been explored yet, but which companies are starting to now, such as genetics,” says van Huis. “Insect breeding is relatively new; it's only been going on for a couple of years. I think the progress that can be made there is significant.” Furthermore, he says, “the big companies are starting to get involved. Nestlé put out a product, Purina, which is a pet food that contains insects. So, I think

other big companies will come on board as well.”

Hernández Álvarez points to Thailand as a leader in insect farming. “They developed a successful strategy to help rural communities – with the creation of little farms around the country, increased the local insect market and linked insect production with gastronomical tourism. But some industrialised countries are paving the way in insect farming as well, such as the Netherlands.”

## Cricket tea?

But what about insects farmed for human consumption? Insects are an excellent source of protein: per 100g, crickets contain 69g of protein, compared with 19.4g for beef, 19.5g for chicken and 17g for pork. Crickets are also good sources of other nutrients, such as calcium, iron and vitamin B12.

Hayden Smith, co-founder of The Cricket Hop Co., thinks that consumers are slowly becoming more used to the idea of eating insects and insect-based foods. “They know insects are the future of food and that the way we’re currently farming is unsustainable and damaging to the environment. If I can get my mum and dad to eat them, then the world is definitely changing!”

The Cricket Hop Co. specialises in cricket flour, a high-protein product that can be used in many foodstuffs, from smoothies to baked goods, salads and curries. “Our main goal is to make crickets accessible, so I came up with easy-to-make, cricket-friendly recipes for the consumer to easily incorporate our cricket flour,” explains Smith. Based in Guernsey, the company produces in Asia and sells its products worldwide. “I think that in 5–10 years, we’ll see crickets evolve like sushi did – soon, they will just be accepted as ‘the norm’,” says Smith.

A study by Sainsbury’s and Eat Grub backs this up. One in five shoppers said they could see the advantages of eating edible insects, and one in four said they would be willing to try insects in the future. Francesco Majno, co-founder of Small Giants, a company that produces savoury insect-based snacks, also believes we will see a huge uptick in people choosing to eat insects in the future. “The demand for alternative protein sources is driving the growth of the edible insect market,” he says. His company is already seeing significant interest from investors, with £130,000 raised in its previous round of investment funding, and £250,000 being raised this time at a valuation of £1.5 million (pre-money).

## Bitten by the bug

“Governments across the world have been very supportive to date, but they need to further embrace this industry as one of their core climate management initiatives – like solar and wind for energy,” says Drew. In the EU, things look positive on the regulation side. The IPIFF, which represents the interests of the insect production sector in the EU, has helped to make significant headway in terms of the use of insects for both human and animal consumption.

A 2020 study by Meticulous Research estimated that the edible insect market could be worth US\$7.96 billion by 2030 and could help to feed both animals and humans. With companies receiving investment and producing new products, and regulatory bodies continuing to take an interest in the sector, it seems insect farming will only go from strength to strength.