

## INSECTS AS A SOURCE OF PROTEIN

# Wageningen gets the bug

**Insects are savoured as a nutritious snack in many parts of the world. Not in Europe though. There they are considered at best a nuisance and at worst scary. Wageningen University aims to find out which insect species are suitable for breeding and as a food ingredient in everyday foods such as pizzas.**

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**T**hese are real beauties.’ Marian Peters, secretary of the insect breeders’ association Venik, takes a large dried locust out of a pot and examines its head. ‘This is pure design.’ She pulls the brownish wings off in a practiced manner and pops the plucked insect in her mouth. The ‘beauty’ meets its final destination with a crunch. ‘Delicious, a slightly nutty flavour, a perfect addition to a salad’, says Peters. The Venik secretary is enthusiastic about the idea of insects as a food for both humans and animals. Breeders are working with Wageningen University to try and get insects onto Dutch dining tables. Pots of freeze-dried locusts and various kinds of beetle larvae can be found in limited quantities at one or two supermarkets. But most of the insects being produced go to wholesalers to be sold as animal feed. That will change if Peters has anything to do with it,

and human consumption of six-legged creatures will give a boost to the insect breeding sector. ‘There is no market for it at the moment’, says Peters. ‘Current supply levels are sufficient to satisfy the demand for insects as animal feed. We need to gain people’s confidence gradually and build up the sector step by step.’ Peters started doing this two years ago when she presented her freeze-dried insects at the Dutch catering trade fair Horecava. But the time was not ripe for this new product. ‘Cooks didn’t know what to do with it and didn’t want to be associated with it either’, says Peters. ‘That is changing in a big way now, thanks to all the publicity.’

### CRICKET NUGGETS

Peters is not alone in her enthusiasm for insects as food. Arnold van Huis, professor of Entomology at Wageningen University, >



An image of a future in which many food products contain insect protein



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thinks that Westerners should take this promising food source more seriously. If it is up to him, the Dutch will soon be tucking into cricket nuggets, caterpillar steaks and mealworm burgers. 'About 80 per cent of the world's population eats insects. In the tropics in particular, they are a standard part of the daily diet', says Van Huis. 'And insects are even considered a treat, not just something you eat because there's nothing else.' Caterpillars and locusts are popular in Africa, wasps are a delicacy in Japan, and crickets are eaten in Thailand. In China they do not even balk at eating scorpions, close relatives of insects. One reason for the popularity of

insects is that these countries have a tradition of food gathering. Van Huis says the reason insects are not actually bred in these countries is because their natural food is not available all year round. Insects often eat specific plants only. That could be a problem, for example during a dry period. Van Huis feels it is a missed opportunity that insects have never been considered in development cooperation as a means of solving Africa's food problems. He is a consultant to the United Nations Food and Agriculture Organization (FAO), with the aim of promoting the use of insects to help ensure global food security.

### FEEDING THE WORLD

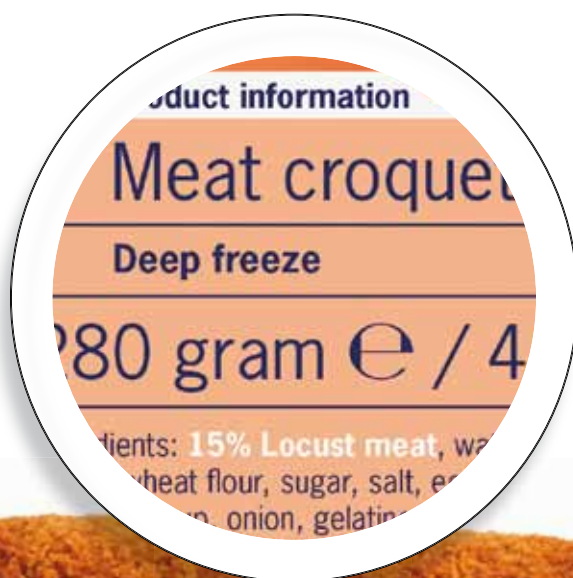
The experts say insects are not just tasty, they are also more sustainable than traditional livestock. At present, 70 per cent of agricultural land is required for meat production. What is more, says Van Huis, beef production needs a vast amounts of water: between 20 thousand and 40 thousand litres per kilo. And further big increases are expected in meat consumption because of rising prosperity and the growing world population. In China alone, consumption has doubled in recent decades; it now stands at 50 kilos per person per year. Eventually there will simply not be enough

meat to go round. Van Huis thinks insect meat would be a good solution to this problem.

### BADLY WASHED VEGETABLES

Insects have other advantages over cows, chickens and pigs. They do not need antibiotics and any diseases they might carry cannot be transferred to humans. Also, they like to live at close quarters in the dark. That makes them very efficient in the use of space, but Van Huis says this also makes animal welfare much less of an issue than it is for traditional farm animals. What is more, insects grow efficiently. 'They are cold-blooded and so they don't need to use up energy maintaining their body temperature', says Van Huis. 'As a consequence they are very efficient in converting food into meat.' Insects also have a high nutritional value and are a rich source of protein, healthy fatty acids, and important vitamins and minerals. Adults only need 100 grams of insect meat to meet their daily requirements for protein, iron and vitamin B. And yet the Western diet barely includes any insects – not counting the quarter kilo we swallow every year without noticing in our peanut butter or badly washed vegetables, or the red food colouring in pink icing, which is made from ground cochineals. According to Van Huis, the reason insects do not feature more prominently on the menu in North America and Western Europe is that there are relatively few insects available in large quantities there. So they have not become part of the standard food package. Which is a pity, thinks Van Huis. 'Large-scale consumption of insects is a sustainable, environmentally friendly solution to the problem of providing the growing world population with enough protein-rich food. You can breed insects using waste or even manure, which would help reduce the Dutch manure surplus (Dutch livestock farming produces far more manure than can be used on the land and dealing with this manure surplus

‘Eating insects is a solution to the problem of providing the growing world population with enough protein-rich food.’



has become quite a challenge).’ Over the next few years Wageningen University will be investigating which insects you can breed on these kinds of waste products, and which species offer most potential in terms of protein composition. ‘It is very important that this doesn’t turn into a hobby for a clique of scientists, but that results are applied and are relevant to society’, says Van Huis. ‘That is why Dutch insect breeders are closely involved in the research as well. Plus we will

need to breed insects if we are all going to be eating them’, Van Huis says. ‘Harvesting from the countryside would put too much pressure on wild populations.’

#### FIVE TONNES OF BEETLE LARVAE

At present there are only a few insect breeders in the Netherlands. Some of them have joined forces in the Dutch Insect Breeders Association (Venik). Roland and Michel van de Ven in Deurme, for example, have been

breeding insects for fifteen years. It started as a hobby to supply food for aviary birds, but the insect farm soon turned professional. They now mainly breed mealworms, about five tonnes a month. These beetle larvae are undemanding and are perfectly at home in the dark in stacks of crates. They are fed primarily on waste roots and bran. They produce relatively little manure and the two breeders have found a fruit grower and several gardeners who are eager to have the light-brown, virtually odourless granules. The larvae are ready to be sold after about ten weeks. ‘At the moment we are mainly supplying animal feed wholesalers; a small part of what we produce is for human consumption’, says Michel van de Ven. He works to the same food safety standards as livestock farmers. He also uses track and trace, a system used in intensive livestock farming to determine where a product comes from.

#### DIFFERENT MINDSET

But are the Dutch really ready to tuck into a plate of dried locusts? Wouldn’t they rather have a juicy beefsteak? ‘It is quite a challenge to get the Dutch to bite into a locust head. It’s difficult to break down that cultural and psychological barrier’, thinks Van Huis. ‘People have to get into a different mindset; a positive experience of eating insects can help them overcome their reluctance.’

Van Huis thinks it may be possible to win consumers over by putting ground insects in appealing products so that the bugs cannot be recognized as such. He also sees the extraction of insect proteins and their inclusion as an ingredient in other food products as a means of helping them to become more acceptable. For instance, you could add insect proteins to pizzas with meat product toppings. Deep-fried snacks are also well suited to having insect proteins mixed in with the chicken or pork. The Dutch Ministry of Agriculture, Nature and Food Quality takes insects as food so seriously that it >



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has given Wageningen University a grant of one million euros to carry out research on the sustainable production of insect proteins for human consumption. This means there is a chance that even the conservative Dutch will eventually be eating insect burgers. 'We haven't been taken seriously in the past - "oh, those chaps with their hobby"- but I'd like to talk to those critics again in five years' time', says a confident Van Huis.

**FEAR FACTOR**

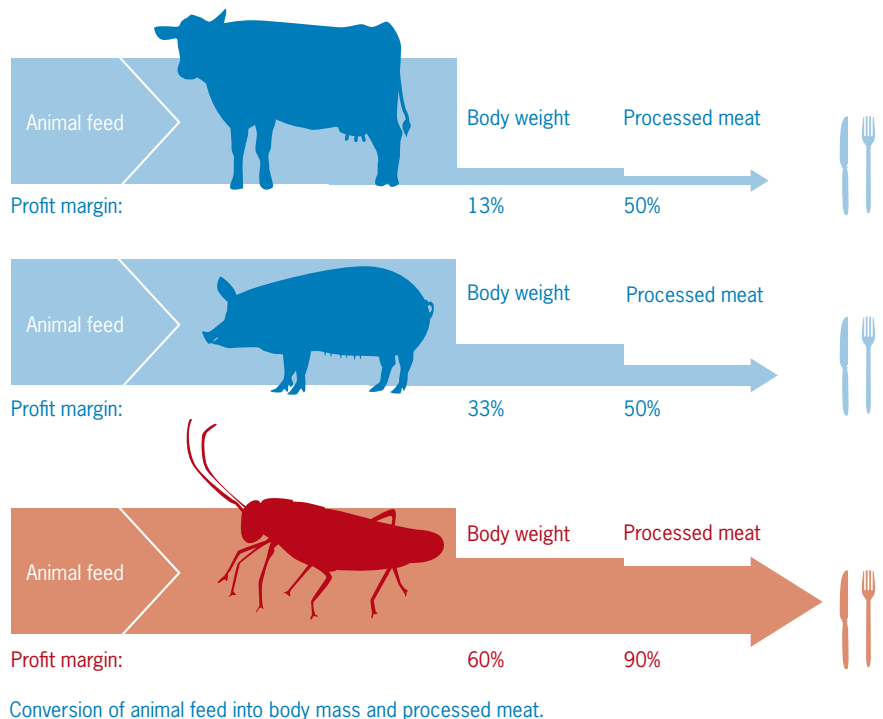
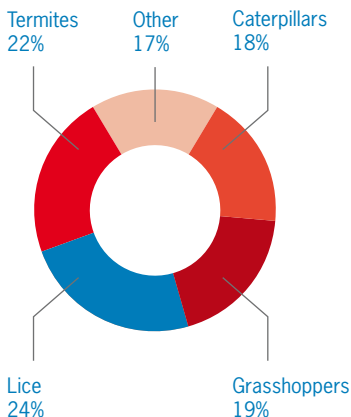
Professor of Entomology Marcel Dicke is another passionate advocate of insects as an alternative to steak. 'We have been working since 1996 to get the general public to see the positive side of insect food', he says. 'Eating insects was very much a fear-factor thing at first but there was a gradual change

around 2000.' In 2006 Dicke and his team won the Academic Annual Prize, which enabled them to organize the City of Insects festival at which tens of thousands of visitors were initiated into the lives – and the flavours – of insects. According to Dicke, the City of Insects marked a turning point in people's attitudes to insects as food. 'These days, 95 per cent of the people attending our talks will try the insects and 80 per cent find them tasty', he says.

Yet there is still no demand among consumers for insects on the supermarket shelves, says Anoesjka Aspeslagh, spokesperson for the Albert Heijn chain of supermarkets. 'Insects are very exclusive and only a very small group of consumers is interested in them. Most consumers are not remotely ready for this. We will only put a new product

**INSECTS AS FOOD**

**Most commonly eaten insects worldwide**



on the shelves if we feel that people are really prepared to try it.' So for the time being, Albert Heijn is focussing on other meat substitutes such as soya. Insects may be almost impossible to get hold of in supermarkets (with the exception of wholesaler Sligro), but Dicke is still optimistic. 'After all, we eat oysters and snails, which are none too popular in other cultures', he says. 'I think that

there'll be plenty of insects in the shops in ten years' time and you will easily be able to buy a hundred grams of locusts or beetle larvae.'

He feels acceptance is already increasing.

'There were insects on the menu when Gerda Verburg, the Minister for Agriculture, entertained foreign guests. Verburg has given the new insect sector an important boost with her grants, putting insects on the agenda and

even on the menu. That is a breakthrough.'

Dicke says if you want to get large-scale insect consumption off the ground you have to present them temptingly. Restaurants have an essential role to play here. 'You need to present insects as a delicacy, and you can charge accordingly. People will always be keen to try out something special', says Dicke. 'An exquisitely decorated strawberry with chocolate and topped with mealworms or a locust sounds exclusive. People see that as a challenge.' If there is one person capable of presenting insects in an unusual manner, it is Robert van Beckhoven, a trendsetter in the world of patisserie. You won't find this top pastry chef's creations in the average high-street bakery. For example he developed a line of erotic confectionary – 'adult pastry'. And he has recently started adding insects to his products. Last spring, his mealworm muesli bar was voted the tastiest insect snack by the audience at a talk by Marcel Dicke. 'I like experimenting and insects have a good flavour', says Van Beckhoven. 'I like to do new things and get people to change their attitudes. Insects in patisserie fit in with that philosophy. You do need to be refined and subtle when putting insects in a product so as to keep it a positive experience', says Van Beckhoven. 'No-one will buy your product if it has tree-hugging, knit-your-own-yoghurt overtones.' So he advocates a strategy of disguising and seducing: a fantastic-looking product in which insects have been subtly incorporated.

Van Huis and Dicke may see a rosy future for insect foods, but there is still a lot of work to be done on product development. What breeding methods are best and which species are most suitable? Ascertaining this takes time but, as both professors point out, the current livestock farming system was not built in a day either. The possibilities are endless, given the more than one thousand insect species eaten around the world. With meat from livestock you do not have more than a couple of dozen possible variations on a theme. ■



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