# Crunch time for the insect industry

This has long been the land of the locust eaters, but Thailand is now poised to take advantage of the West seeing bugs as the new super food ***By Paritta Wangkiat***

"Have you tried cricket yet?" The question pops up at the top of the New York-based Exo company's website. It sounds uninviting for those who imagine the whole body of a bug. But don't judge. Scroll down.

You'll find energy bars made with cricket flour in fashionably minimalist packages with the company's eye-catching logo. The product is marketed as being a rich source of protein and gluten free. One bar contains 40 crickets and the equivalent of 10g of protein.

Founded in 2014, the company developed the protein bars in the strong belief that insects will have a major role to play in the future of the global food industry.

But Exo is not the only one placing confidence in crickets leading the food revolution.

Searches on Amazon reveal there are many companies out there with products made from cricket flour, including from cookies, chips, pasta and even energy capsules.

Massimo Reverberi, the Italian-born director of start-up Bugsolutely — the only Bangkok-based company that produces pasta from cricket flour made in Thailand — also sees the potential nutritional and economic benefits in crickets.

"They [local people] may see insects as a kind of cheap food only consumed by people in the countryside. Middle class or educated people may not eat them," he said.

"But in the West, edible insects have become fashionable. It's a super food with good taste and high nutrition."

He called Thailand "a mother lode of edible insects" which has attracted a lot of new and emerging Western companies that have come seeking crickets.

"They know bugs are coming."

## SENDING OUT FEELERS

There are no official figures for the global edible insect market. But one analysis, from Boston-based Lux Research, anticipates alternative protein will claim a third of all global protein consumption by 2054.

"Consumer preference, concerns over the planet's ability to produce sufficient meat, impact of livestock agriculture on the environment, and mounting scientific advances are driving the changing protein demand," the research found.

Mr Reverberi believes edible insects will be one of the main alternatives.

His enthusiasm began three years ago, after he was asked to participate in Thailand-based research led by European academics investigating the nutritional value of insects.

What he found, echoing Food and Agriculture Organisation data, was that edible insects are a healthy and sustainable option for consumers.

For each 100 grammes, adult crickets contain 8-25g of protein, compared to caterpillars and silkworms (10-17g), adult locusts and grasshoppers (13-28g), beef (19-26g) and mackerel (16-28g).

Most edible insects boasted equal or higher levels of iron than beef. Many, such as the mopane caterpillar, are an excellent source of iron.

The FAO says insects are environmentally friendly as they emit a lot less greenhouse gases than livestock, consume less water and do not require large swathes of land to be cleared for the production of animal feed.

After extensive research, Mr Reverberi started

developing cricket pasta and launched his product this year.

Pasta is an easy way to approach consumers who have never tried insects, he thought, while crickets can be easily found in local farms.

Mr Reverberi has sent more than 250 samples of his cricket pasta to food outlets around the world.

He has customers in South Korea and is on the verge of an agreement with a UK distributor. Markets in the US, Australia, New Zealand and Japan are his next targets.

For now, sales are small. He has not been able to sell through supermarkets or retailers as operators are not confident customers will buy edible insect products, even ones without a trace of a bug in their appearance.

Production is in its infancy, with three companies making flour from Thai crickets — with some investment from Britain and France.

There are also cricket farms in Laos and Cambodia.

"But it will be bigger," Mr Reverberi said firmly.

Two years ago, he observed that the market seemed to have no place for edible insects. But it began to bloom last year.

The market share is expected to increase in the next two years when the European Union, the world's largest food importer, is expected to allow edible insects which are now prohibited.

## CRAWLING INTO NEW MARKETS

When insect lovers visited World Expo 2015 with the theme "Feeding the Planet, Energy for Life" in Milan last May, they were disappointed to find cricket flour and canned insects from Thailand were securely locked in glass display cases.

Exhibited in the Future Food District zone, the insect products were not allowed to be tasted because of restrictive Italian regulations designed for consumer safety.

But light shone on producers in November after the EU agreed to a new regulation on novel food. Novel foods are defined as goods that were not consumed to any significant degree in the EU before May 1997, when the legislation first came into effect.

Insects appear to fall into this category under the new regulation, after years of the European Food Safety Authority saying that it lacks data on consumption.

The regulation allows third-country consumption data to be considered in the EFSA's food risk assessment, and also simplifies and speeds up the authorisation process for products that apply for assessment.

If approved by the EU parliament and council of ministers, the regulation is likely to mean edible insects can enter the European market by the end of 2017.

"This will be the opportunity for Thailand and Thai cricket farmers," said Yupa Hanboonsong, an entomology expert at Khon Kaen University's Faculty of Agriculture.

"Thailand has farmed crickets for over 20 years with an advanced technique that assures that the crickets are clean and safe."

During the 1997 Asian financial crisis, also known as the Tom Yum Kung crisis, Ms Yupa and fellow KKU entomologist Tasanee Jamjanya noticed many Khon Kaen residents returned home after losing jobs in other cities.

Both suggested the locals farm crickets as an alternative source of income. There was already a domestic market because insects have long been eaten by northeastern people.

Today, the number of cricket farmers has grown to more than 20,000, with most based in northeastern and northern provinces.

Their scale of production is considerably lower than the world's largest cricket producer, Canada.

But the cost of raising crickets so far north is more expensive than in tropical countries because the farms require temperature control systems. This results in Canadian cricket flour costing between 2,100 and 4,800 baht per kilo, according to Bugsolutely's survey, while Thailand can produce cricket flour for between 700 and 900 baht a kilo.

PHOTOS: TAWATCHAI KEMGUMNERD

> In the West, edible insects have become fashionable. It's a super food with taste and high nutrition
>
> **MASSIMO REVERBERI**
> **BUGSOLUTELY DIRECTOR**

**CRICKETS ARE TOP WICKET: Above, cricket larvae. Left, Jai Polsaen feeds crickets at her farm in Suphan Buri. Below, crickets from Buriram are sold at 150 baht per kilo.**

PHOTO: THANARAK KHUNTON

## CHIPS WITH CHIRP

To promote Thai crickets, Khon Kaen University developed cricket flour and shared the method with foreigners interested in producing insect-based food.

This know-how has also been transferred to local cricket farmers. There are two main methods of making cricket flour, either by drying crickets with heat or freezing fresh crickets and crushing them into a powder.

The heating process causes some loss of nutrition, but frozen bugs are considered premium quality as full nutrition is retained.

KKU also developed noodles and crisps made with cricket flour.

"Within the next five years, especially if the EU starts implementing the new regulation on novel food, a lot of people will flood in," Ms Yupa predicted.

"But the question is, will Thailand be able to grasp this benefit in the next two years?" »



PHOTOS: AFP AND 123RF

IT'S JUST NOT CRICKETS: Top, insect flour. Above and below, pasta made from crickets or locusts.

» Ms Yupa, who has gained an international reputation as an edible insect expert, has regularly been visited by organisations, educational institutions and insect food companies interested in developing products from crickets.

Those visitors include a US energy food company and a Belgian business making supplementary food capsules from cricket flour.

The latter was able to convince some Thai private hospitals to use the capsules to help patients get their weight under control.

She said many decision-makers haven't yet seen the opportunity beyond using whole insects as food, which is worth between 70 and 80 million baht to the economy.

"They know how to add value," she said. "We can do that too. But Thailand doesn't have a food quality standard for insects. This makes it hard for local farmers to convince buyers of the insects' quality."

## BUGGING THE AUTHORITIES

No food quality standards need to be met to sell insects to local markets as Southeast Asians have been eating bugs for centuries as part of their daily lives. Thailand has never had a food standard certification for edible insects.

Ms Yupa said it would be a different story when entering international markets.

Edible insect products will need to be certified under the Good Agricultural Practice audit, organised by the UN's FAO, to convince importers they are clean and safe.

For now, edible insect products from Thailand can only get Good Manufacturing Practice certification, which doesn't completely answer questions Western consumers raise concerning the origin of the bugs.

Products can be exported, Ms Yupa said, but there will always be questions like "are crickets in Thailand from the wild?" despite cricket farms being hygienic and environmentally friendly.

"Like milk and other dairy products, Thailand can adopt food quality standards from foreign

> The question is, will Thailand be able to grasp this benefit in the next two years?
> **YUPA HANBOONSONG**
> **ENTOMOLOGY EXPERT**

PHOTO: REUTERS

BUG BOWL: Edible freeze-dried crickets.

countries. But for crickets, Thailand must take the lead in creating standards for itself because insects are still very new to Western culture," she said.

"That needs support from the government. But without support, and without seeing opportunity from adding value into local insect products, Thailand is unlikely to adapt to the global markets."

She said GAP must be introduced to the Thai insect industry by 2018 if Thailand wants to access international markets.

However, there has been an encouraging sign recently from the government.

On May 2, executives of the National Bureau of Agricultural Commodity and Food Standards (ACFS) under the Ministry of Agriculture and Cooperatives agreed to set up a committee to draft GAP for crickets. This came after a long push from the local cricket farm industry.

The process could take more than a year before it is implemented, an ACFS official told *Spectrum*.

There will be public hearings for local farmers and edible insect producers. The ACFS aims to launch the GAP for crickets before EU's regulation on novel food is implemented.

### THE SOUND OF CRICKETS

Entering the small village of 100 households named Saen Tor in Khon Kaen, visitors see a plaster-cast monument, twice the size of a human, of a shiny black cricket clinging to a stump. A soft hum can be heard in the background as the insects chirp away.

"We owe crickets a favour. We want to tell our children that we can get better lives because of crickets," said Petch Wongtham, 53, a village headman and cricket farmer.

Local people started farming crickets in 2007 after a slump in the price of other agricultural products.

It turned out their cricket businesses brought in larger incomes. Their fame soon spread from domestic to international level, with foreign media and companies paying visits every month.

Mr Petch can produce 1.7 tonnes of crickets, valued at about 100,000 baht, for each cricket harvest, which takes 35 to 45 days.

He never dreamed of such a high income when he depended on rice farming.

Crickets grow fast and require less water than plants. They are fed mostly with vegetables and small portions of chicken feed, which allows low or middle income earners to start up farms.

Today, Saen Tor residents can purchase whatever they need. They can also freely give donations during religious ceremonies, which during the years of financial hardship was something they had to think long and hard about.

The most significant change is that farming crickets has given financial security to the elderly, who once thought they would never be able to take care of themselves while ageing and in declining health.

The oldest cricket farmer in Sean Tor village is more than 80 years old. He earns more than 20,000 baht for each harvest.

Mr Petch has realised the global market is opening up and said Saen Tor is prepared. Each villager knows how to produce cricket flour.

If the GAP process is complete and opportunity opens for them, Mr Petch said they might think about making the cricket monument even bigger. ■

# Good grub: The top chefs setting out to prove that bugs belong in the kitchen

By Paritta Wangkiat

**In the middle of 2014, four chefs from Le Cordon Bleu Dusit Culinary School in Bangkok decided to conduct an experiment. None of them had any experience in using insects as ingredients, but they would set out to create palatable dishes from bugs.**

**Using insects sourced in Thailand, they came up with menus like cricket-infused broth, cockchafer (a type of beetle) butter and herb crisp, bamboo worm bite and a grasshopper lotus petal snack.**

**To look at the dishes, there was no trace of insects at all. They were served at the "Edible Insects in a Gastronomic Context" workshop in February last year and received positive feedback from diners, who all said they would be happy to eat insects again.**

**Event organiser Christophe Mercier, academic manager of the school, said the experiment proved the barriers to using insects as a protein source in high-end cuisine are not as significant as many people think.**

**The bigger challenge, he said, is to convince chefs to cook with insects in the first place.**

PHOTOS: SUPPLIED/LE CORDON BLEU DUSIT

TURNING THE WORM: Le Cordon Bleu's head pastry chef Willy Daurade predicts insects will become more common on restaurant menus as chefs become more receptive to the idea.

**It took Mr Mercier almost a year to convince chefs to participate in the experiment. Some argued that cooking with insects was not Cordon Bleu, which relies on classic ingredients and traditional food.**

**"I think the first step is to break down the walls with chefs. We have to convince them that it's OK to try things," he said.**

**"For chefs, especially French ones, they have been told their whole lives that there are no bugs in the kitchen. And now we asked them to put them in pots. So can you imagine the effort they had to make?"**

**Chefs are always under extreme pressure, he said, because they have to ensure their food is safe. Insects are new to them, so reassuring chefs that insects are safe to eat, as well as having nutritional benefits, is important.**

**"At Le Cordon Bleu, we do innovation and tradition. We also explore news things; this we can't avoid," he said. "What if all the famous chefs worked with [insects]?"**

**There is also the issue of feeding a growing world population.**

**"I believe insects can play a bigger role in cuisine," said the school's head pastry chef, Willy Daurade, who participated in the event last year.**

**"Because in the future we will have more people and we don't have enough meat. We need to find a solution," Mr Daurade said. "It's the chefs' challenge. We like to [innovate], and if it's for a good reason it's even more interesting."**

**Mr Daurade made bamboo worm bite, a golden sphere-shaped sweet made with dried bamboo worms with flour, and cream tiramisu mixed with stink bug.**

**He said some Michelin-starred restaurants had started using insects, and that he and his colleagues would keep pushing the limits of insect-cooking innovation. ■**

BUG APPÉTIT: Willy Daurade's bamboo worm bite, a golden sphere-shaped sweet made with dried bamboo worms and flour.