



#16 food & farming

DDD » Issues » 16 food & farming » Trend » *The Future Protein?*

Frédéric Viala

The Future Protein?

Insects are a sustainable source of protein since they eat bio-waste. ENTOFOOD aims to produce insects on industrial scale. An interview with Frédéric Viala who founded the firm in Malaysia.

The growing world population threatens future food and feed security. Natural resources can and must not be exploited to satisfy expected growth, so sustainable innovations are critical. Over the last ten years, the demand for fishmeal has increased fourfold, while the FAO has been promoting edible insects as a sustainable source of food and feed. Since 2012, ENTOFOOD has operated a pilot farm in Malaysia that uses an award-winning bioconversion technology to process organic waste into insect-based protein feed for animal nutrition. Founder Frédéric Viala shared his hopes and the challenges facing the industry, and called for a reform of the current restrictive regulations for insect feed in Europe.

DDD: Even today, we still don't know all that much about insects and

especially about the production of insect protein compared to other products. Where did you get your expertise?

Frédéric Viala: In 2011, when we started the first “laboratory” in Madagascar, there was pretty much no information available on insect farming. With my partner Franck Ducharne, a skilled and experienced biologist who specializes in invertebrate farming, we selected six insect species to test their performance.

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After our initial evaluation, we selected the Black Soldier Fly mainly for two reasons: First, the feeding range of the larvae is very broad. Secondly this species is spread all over in tropical and temperate regions alike. So if you want to use the technology somewhere else, you do not have to import the species. Five years ago we started research and development and now we are ready to produce on an industrial scale. We then developed the two sides of this biotechnology. There is the biological side of insect farming - everything concerning the Black Soldier Fly, its life cycle, feeding regime, and so on. There is also the technological side. Transforming the maggots into insect meal, how to process it in order to meet market demand in terms of quality, quantity and price. The pilot farm we have operated in Malaysia since 2012 allowed us to gather a massive amount of data, which constitutes a very important asset to ENTOFOOD and enables the company to develop, with a very high degree of confidence, reliable forecasts for our business plan and up-scaling.

DDD: What motivated you to start the business?

In late 2009, I was doing macro analysis of the world protein market and fishmeal in particular. It highlighted a future protein crisis. Actually, the world had already faced some episodes like the 2007-2008 food-price issue resulting from the combined effects of high oil prices, low cereal stocks, speculation in food markets, competition for cropland from biofuels, and extreme weather events. I understood that there would be a global shortage of protein in the coming decades. I realized the world would have to find new protein sources to feed an ever-increasing population. I felt that it was a good time to start a new business.

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was 2,400 dollars per ton.

10 years ago, it would not have been possible to produce insect protein, because the price of raw commodities was very low. It was not economically profitable to manufacture an alternative protein. But in 2010, it was time to get started, so that a few years later we would have developed a new reliable protein. In 2001 the price for fishmeal was less than 500 dollars per ton, whereas last year in December the price of fishmeal reached 2,400 dollars per ton. At this market price we can sell insect meal for around 1,300 dollars per ton. We have now reached a competitive price that represents a unique window of opportunity.

DDD: How were you able to start the business? Did you profit from funding or did you have investors who are now expecting revenues?

People understand that insects provide the perfect scenario: If you give protein to an insect, it returns the same amount as insect protein.

We started with family equity. To date we have financed all our research and development, hence we fully own the intellectual property. We are looking for partners to rollout our technology through direct development, licensing or technology transfer. We have already started in France with our partner SFLY Protein and we are negotiating to start in Malaysia soon. The interest in this technology is increasing all over the world.

Five years ago, no one was talking about insects and now it is a very popular topic. When mastered on large scale, insect farming involves converting a large amount of organic waste through insect's bioconversion every day. At the end of the process, within a week, insect eggs turn into maggots, which can feed animals like fish, chickens, pigs, and the by-product is an organic fertilizer. No solid waste is generated. The insects provide the perfect scenario: If you give protein to an insect, it returns the same amount as insect protein. Insects are very efficient organisms and the process is sustainable and environmentally friendly.

DDD: Could you tell us a little bit more about your customers?

We mainly work with feed manufactures and fish farmers. Feed manufacturers produce feed for animal nutrition (chicken, fish, or shrimp). We work closely with them, as insect meal

will be included in the compound feed they produce. The end-users are the fish farmers and we also work with them when it comes to trials. In the feed industry, key elements are cost and performance, therefore the introduction of new raw material requires going through a validation process. Hence, to prepare the ground for product marketing, ENTOFOOD implemented validation trials on the different targeted market species. During the past two years, the company initiated and completed trials with large feed mill companies on different species to gather biological data on insect protein performance. This program provides factual validation of the quality of the insect-based products and it is preparing the ground for marketing purposes: raising topics ENTOFOOD discusses with its future customers.

DDD: It is very interesting to see that an innovative approach has been developed outside of Europe by people originally from Europe. You mentioned that the regulations regarding insect feed are very strict in Europe. Maybe you could expand on what makes it difficult to conduct this research in Europe.

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80% of the world's aquaculture business is located in Asia. Europe only contributes 4%. Working there is easier, since insects are already widely used as food in some Asian countries. In Europe the topic is brand new. As a consequence of TSE, aka "mad cow disease", Europe has strict regulations for animal feed. We could have done research and development in Europe, as some other companies are doing, but the cost is higher. Europe should not be neglected though, as it is a potential added-value market.

The European regulatory framework should then conform to the market reality.

I would like to add that we would like European regulations to collectively evolve, but the process is slow. Regulations do not allow insect farming in Europe or only very narrowly. The problem is that the European regulations are the same for insects and animals such as cows, pigs and chickens. So they require special slaughtering methods for insects. Insects are invertebrates like shrimp; they don't have to be slaughtered. Let's be optimistic: Europe is

close to approving a regulation on novel foods and the European Food Safety Authority (EFSA) is set to publish its risk assessment about the safety of insects for food and feed in the days ahead. The European regulatory framework should then conform to the market reality.

DDD: Obviously, when we think of flies, there is the preconceived notion that flies eat feces, that they are dirty insects and transmit diseases. How can you dispel this idea?

We generally use the word ‘fly’, but the Black Soldier Fly belongs to the Diptera order, meaning “two wings”. Fly is a generic term. One should not confuse it with domestic flies that can be harmful and the source of diseases. The insect we work with, the Black Soldier Fly, is completely different from this domestic fly. Actually it spends most of its life as a larva, not as an adult with wings. It is a maggot for 30 days, and a so-called “fly” for only 7 days. The Black Soldier Fly doesn’t eat as an adult. Its only tasks are to mate, to spawn and then to die. Since they don’t need to eat, you will never find them in your house; even here in the tropics, they live at the top of the canopy. In addition, the PROteINSECT project, which is an European Union initiative, is building a pro-insect platform. They conducted a survey on insect use, which found 72% acceptance among end consumers in European countries. That is pretty encouraging.

DDD: ENTOFOOD addresses two problems in the world’s food production, one is the sustainable production of animal protein, and the other is the recycling of organic waste. How does recycling organic waste make production more sustainable?

The fermentation of organic waste releases a lot of methane. And as a greenhouse gas, methane is 20 times more powerful than CO₂.

In most wealthy countries, the U.S. and Europe, only 25% of food waste is organic. In Asia 50% of food waste is organic. So here in Asia, there is a lot of organic waste, but there are only a few industries for recycling like there are in Europe where you have incinerators, big composting plants, and sanitary landfills. The landfilling of organic waste is toxic as it causes soil and groundwater pollution. Everyone thinks that pollution comes from plastics and cans, which do represent pollution, but do not emit gases. The fermentation of organic waste

releases a lot of methane. As a greenhouse gas, methane is 20 times more powerful than CO₂. The carbon footprint of landfills with organic waste in the U.S., for example, is equal to the carbon footprint of the automotive industry. It is huge. So it is a very good thing to use organic side-streams to feed the insects and give more value to the waste. Of course not all food waste is recyclable. We have to avoid any chemical or drug hazards. We only use traceable and safe waste that meets the necessary quality standards.

DDD: Right now you are focusing on animal feeds. Are you also considering processing insects for human nutrition?

Insect as food is another market. It is already well established in countries like Thailand and nowadays the demand is growing in Europe. But it is not the same job. Our target is to produce sustainable insect protein on a large scale.

DDD: Where do you see your company and food production in general in ten years?

I think in ten years, we will have a lot of competitors, but at the same time, the market will develop as the population is increasing and as the need for alternative sustainable protein is growing. There are already a few similar projects, some in South Africa, some in the US, Canada, and Europe.

Aquaculture production is set to double by 2050. We need to work actively on a new protein because the industry needs it.

Given the scarcity and price of the fishmeal, the industry is increasing the vegetal protein proportion in compound feed. But carnivorous fish such as salmon need animal protein in their feeding regime. Insect protein is a very good, very safe alternative at a competitive price. There will be incredible demand. If you have two fish on your plate today, one is from the sea, the other from aquaculture. All the extra fish we will consume in the future will come from aquaculture. According to World Bank, aquaculture production is set to double by 2050 in order to meet projected demand for fish worldwide. We are actively working on this new protein because the industry needs it. We have some more project ideas, but for now we are focusing on the Black Soldier Fly as an innovative and sustainable answer that addresses two problems; the huge need for protein for animal nutrition and the recycling of organic

waste produced by human activity.

Interview: Frederik Caselitz

Photo: © ENTOFOOD



Frédéric Viala

Frédéric Viala is the founder of ENTOFOOD, an innovative Malaysia-based start-up providing sustainable insect protein for fishmeal substitution. He has more than 20 years of experience in entrepreneurship management and start-up development. Frédéric Viala is business oriented with strong ethical value: social and environmental impacts.

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