PROteINSECT Final Conference

Book of Proceedings

27th April 2016

PROteINSECT

INSECTS AS A SUSTAINABLE SOURCE OF PROTEIN

Insect Protein
Feed for the Future

#insects4feed

27th April 2016

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration

PROteINSECT
INSECTS AS A SUSTAINABLE SOURCE OF PROTEIN

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Insect Protein – Feed for the Future

Wednesday 27th April 2016 (09:30 – 16:30) at **University Foundation.**

Egmontstraat 11 rue d'Egmont - 1000 Brussels

www.proteinsect.eu

Insect Protein – Feed for the Future

Wednesday 27th April 2016 (09:30 – 16:30)

University Foundation, Brussels

Conference Schedule

09:30 **Registration Opens**

10:00 **Conference opens**

Welcome by Joint Chairs

Elaine Fitches (PROteINSECT Co-ordinator) &
Paul Vantomme (Advisor to FAO)

Opening of Conference by Jan Huitema (MEP)

Member of the European Parliament from the Netherlands and member of the European Parliament Committee on Agriculture and Rural Development.

10:15 **Overview Session**

Policy, Industry and Environment

PROteINSECT addressing the protein deficit
Dr. Elaine Fitches, Fera Science Ltd (PROteINSECT Coordinator)

Insect as food and feed – A global perspective
Paul Vantomme, Advisor to Food and Agricultural Organisation

Assessing the Commercial Potential of Insect Protein
Antoine Hubert, President of International Platform of Insects for Food and Feed

Regulatory Framework of Insect Protein in the EU
Dr. Wolfgang Trunk, European Commission, DG Sante

Consumer Acceptance
Rhonda Smith, Minerva UK Ltd

Question and Answer Session One
Chaired by Paul Vantomme, Advisor to FAO

11:30 **Break and Additional Registration**

12:00 — Science Session One

Quality and Safety

Insect Protein – International Quality and Safety Findings
Dr. Adrian Charlton, Fera Science Ltd

12:40 — Science Session Two

Sustainable & Profitable European Production Systems

European Insect Production Systems in PROteINSECT
Dr. Maureen Wakefield, Fera Science Ltd

ENTODRYA: PROteINSECT Student Engineering Competition
Simon Schantl, University of Applied Sciences JOANNEUM

13:15 — **Lunch**

14:00 — Science Session Three

Sustainable & Profitable International Production Systems

West African Insect Production systems in PROTEINSECT
Dr. Marc Kenis, Centre for Agriculture and Biosciences International (CABI)

Chinese insect production systems in PROTEINSECT
Prof. Richou Han, Guangdong Entomological Institute

Life Cycle Sustainability Assessment
Prof Bart Muys, KU Leuven

15:00 — **Break**

15:20 — Science Session Four

Animal Feeding Trials

Insect Protein - Outcomes from Fish, Pig and Poultry Feeding Trials
Dr. Geert Bruggeman, Nutrition Sciences

16:10 — **Question & Answer Session Two**

16:30 — **Closing remarks by Dr. Elaine Fitches, Fera Science Ltd**

About your hosts

PROteINSECT is an EU funded FP7 project enabling the exploitation of insects as a sustainable source of protein for animal feed and human nutrition (PROteINSECT Grant Agreement Number: 312084).

PROteINSECT brought together expertise from China, Africa and Europe to encourage and enable the adoption of fly larvae protein into animal feed around the world.

The PROteINSECT project has 12 partners from 7 countries and is co-ordinated by Fera Science Ltd in the United Kingdom.

PROteINSECT research focuses on five key areas in order to evaluate insects as a novel source of protein for animal feed and to ensure that methodologies are sustainable and economically viable.

1. The development and optimization of fly larvae production methods for use in both developed and developing countries at small and large scale.
2. Determination of safety and quality criteria for insect protein products.
3. Evaluation of processing methodologies and the evaluation of crude and refined insect protein extracts in fish, chicken and pig feeding trials.
4. The assessment of the optimal design of insect-based animal feed production systems utilising the results of a comprehensive life cycle analysis.
5. Creation of a pro-insect platform in Europe to encourage discussion about, and ultimately adoption of, sustainable production technologies to include examination of the regulatory framework.

For full information about the PROteINSECT Project please visit our website www.proteinsect.eu or email info@proteinsect.eu.

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Presentations

PROteINSECT addressing the protein deficit
Dr. Elaine Fitches, Fera Science Ltd (PROteINSECT Coordinator)

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West African Insect Production systems in PROTEINSECT
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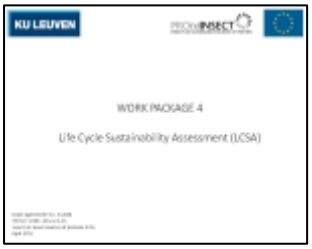

Life Cycle Sustainability Assessment
Prof Bart Muys, KU Leuven

Insect Protein - Outcomes from Fish, Pig and Poultry Feeding Trials
Dr. Geert Bruggeman, Nutrition Sciences

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White Paper

PROteINSECT
INSECTS AS A SUSTAINABLE SOURCE OF PROTEIN

Insect Protein – Feed for the Future

Addressing the need for feeds of the future today

White Paper 2016

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INSECTS AS SUSTAINABLE SOURCES OF PROTEIN

Feed for the Future Conference – Speaker Profiles

Dr. Elaine Fitches, Fera Science Ltd (PROteINSECT Coordinator)

PROteINSECT addressing the protein deficit

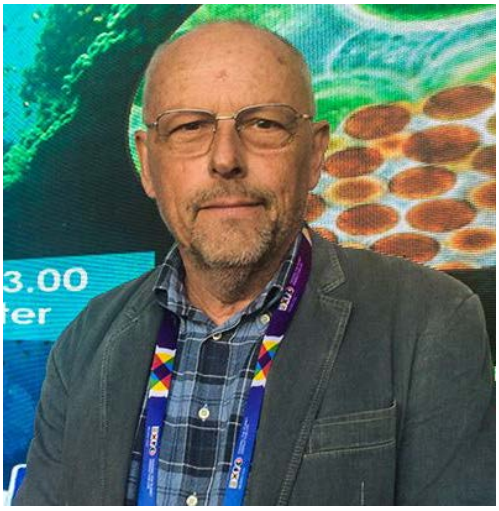
Dr Elaine Fitches is a Research Fellow in the School of Biological and Biomedical Sciences at Durham University, with a focus on applied entomology and, specifically, the investigation and development of novel approaches for the control of invertebrate pests.

She also works in the Pest Management Team at FERA Science Ltd as a plant and insect biotechnologist.

She became co-ordinator of the EC-funded PROteINSECT project in 2013.

Paul Vantomme, Advisor to Food and Agriculture Association (FAO)

Insect as food and deed – a global perspective



Paul Vantomme graduated as Agriculture Engineer in 1977 at the Ghent State University (Belgium). He is a Rural Development and Natural Resources Management expert with 38 years of international experience in tropical countries addressing research and development issues in natural resources management and food security for sustainable development, including extensive field work in many countries of Asia, Africa and Latin America.

FAO's mandate is to raise levels of nutrition, improve agricultural productivity, better the lives of rural populations and contribute to the growth of the world economy in support of its 191 member countries.

Jan Huitema (MEP), member of the European Parliament Committee on Agriculture and Rural Development

Opening Address

Jan Huitema is a member of European Parliament from the Netherlands, with experience in dairy farming and a focus on representing the interests of farmers. He is also a substitute member of the Committee on the Environment, Public Health and Food Safety.

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INSECTS AS SUSTAINABLE SOURCES OF PROTEIN

Antoine Hubert, President of International Platform of Insects for Food and Feed

Assessing the Commercial Potential of Insect Protein

Mr. Antoine Hubert is Chairman, CEO and co-founder of YNSECT – *The Insect Company* –, and also founding member and President of IPIFF European association.

Antoine Hubert was previously senior scientist at TOTAL and ALTRAN where he managed R&D programs on Sustainable Development applied on bioresources, soil remediation, waste-to-energy and recycled resources. He also launched in 2007 and led the non-profit organization WORGAMIC, dealing with food sustainability, promoting urban agriculture and organic waste recycling within cities, and in 2011 the company ORGANEO operating on biowaste management.

Dr. Wolfgang Trunk, European Commission, DG Sante

Regulatory Framework of Insect Protein in the EU

Dr Wolfgang Truck is Policy Officer in the field of feed legislation at DG Sante, based in Brussels. This concerns additives, dietetic feed, emerging feed materials, nanofeed and compound and medicated feed. He also has experience in animal welfare and food safety.

DG Sante monitors enforcement of new food and product safety laws, listens to all interested parties on food safety, and offers support for projects and proposals in the area.

Rhonda Smith, Director of Minerva UK Ltd.

Consumer Acceptance

Rhonda Smith is the founder, director and team leader of Minerva Communications UK, which supports organisations across health, care and science research to build capacity, competence and confidence, delivering strategies that work. Rhonda is an experience strategist and practitioner with expertise in reputation, crisis and issues management.

Minerva Communications UK leads the Pro-insect Platform work package for PROteINSECT.

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INSECTS AS SUSTAINABLE SOURCES OF PROTEIN

Dr. Adrian Charlton, Fera Science Ltd

Insect Protein – International Quality and Safety Findings

Dr Adrian Charlton is Principal Scientist at Fera Science Ltd, with over twenty years of post-doctoral experience in bio-analytical chemistry. He is a member of the management board for PROteINSECT and leads the feed safety and quality work package. He was a member of the European Food Safety Authority working group which published an opinion for the European Commission on the safety of insects as food and animal feed.

Dr. Maureen Wakefield, Fera Science Ltd

European Insect Production Systems in PROteINSECT

Dr Maureen Wakefield is a research entomologist with over 30 years' experience and has particular interests in insect rearing methodologies and insect nutrition. Additional research interests lie in the field of integrated invertebrate pest management, and she has particular interest in understanding insect behaviour and chemical ecology. Maureen is also involved in the development of novel control methods, particularly the use of biological control agents including parasitoids, predators and entomopathogenic fungi.

Simon Schantl, University of Applied Sciences JOANNEUM

ENTODRYA: PROteINSECT Student Engineering Competition

Simon Schantl is a student from the University of Applied Sciences JOANNEUM located in Graz, Austria. He is currently in his 6th semester of the degree program "Sustainable Food Management". Prior to his current studies, he graduated in "Nutrition and Dietetics" in 2013 and wrote a bachelors thesis on "Entomophagy and Malnutrition in South-East-Asia", discussing the potential of insects to feed malnourished people with insects and insect-based foods. He also works as a Junior Researcher in the field of sensory sciences and product development and recently published a paper about how insects can be implemented in various foods.

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Marc Kenis, Centre for Agriculture and Biosciences International (CABI)

West African Insect production Systems in PROteINSECT

Marc Kenis is an entomologist working at CABI, an intergovernmental not-for-profit organisation, specialized in research, scientific publishing and in agriculture, forestry, aquaculture, animal health and the environment. His expertise includes, among others, the use of insects as animal feed and human food. He is presently coordinating “IFWA-Insects as Feed in West Africa” in which CABI and six other partner institutions develop appropriate methods for fly larvae and termite production and utilisation in smallholder farming systems in West Africa, based on waste material. In PROteINSECT, Marc Kenis coordinates the activities on fly larvae production systems (work package 1).

Prof. Bart Muys, KU Leuven

Life Cycle Sustainability Assessment

Bart Muys holds a PhD in Agronomy of Ghent University (1993). He is a full professor of Forest Ecology & Management at KU Leuven, where he evaluates the sustainability of forestry and other biological production systems, and contributes with research to the optimization of these systems for multiple ecosystem services. After much work on the sustainability of the tropical biofuel tree Jatropha, the life cycle evaluation of insect rearing systems for feed in the FP7 PROteINSECT project has offered him an exciting new challenge.

Dr. Geert Bruggeman, Nutrition Sciences

Insect Protein – Outcomes from Fish, Pig and Poultry Feeding Trials

Dr. Geert Bruggeman graduated at Ghent University where he obtained his degree of 'Engineer in Chemistry and Agricultural Sciences'. After his Masters studies, he obtained a PhD in 'Applied Biological Sciences'. Dr. Bruggeman started his job in the Nuscience group end the 90's, and was involved in the development of innovative nutritional products and concepts for livestock nutrition. In his function, he is R&D Manager and is involved in international research and development projects. Finally, he is author and co-author in national and international publications and presented his findings in different international meetings and congresses.

Project Publications

Published

Journal name	Subject or Topic of Publication
Proceedings of the 46th Nottingham Feed Conference	Enabling the exploitation of insects as a sustainable source of protein for animal feed and human nutrition
Journal for Insects in Food and Feed	Assessing the chemical safety of fly larvae as a source of protein for animal feed
Journal of Insects as Food and Feed	Pig manure treatment with House Fly [*Musca domestica*] rearing - An environmental Life Cycle Assessment
BMC Genomics	The developmental transcriptome of the synanthropic fly Chrysomya megacephala and insights into olfactory proteins
ISTA10 Special Issue	Substitution of fishmeal by maggot meal in Tilapia feeds in West Africa
Entomologica	Insects used for animal feed in West Africa
Entomologica	Dirhinus giffardii (Hymenoptera, Chalcididae), parasitoid affecting Black Soldier Fly production systems in West Africa
Journal of Insects as Food and Feed	Sequence homology of the fly proteins tropomyosin, arginine kinase and myosin light chain with known allergens in invertebrates.
Journal of Enviromental Entomology	Advance on value, application and extraction methods of insect protein
Parasites & Vectors	Reference gene stability of a synanthropic fly, Chrysomya megacephala

Submitted

Journal name	Subject or Topic of Publication	Expected publication
Entomological News	Ultrastructure of sensilla on larvae and adults of Chrysomya megacephala (Diptera: Calliphoridae)	June 16
Aquaculture	A comprehensive evaluation of replacing fishmeal with housefly (Musca domestica) maggot meal in the diet of Nile tilapia (Oreochromis niloticus): growth performance, flesh quality, innate immunity and water environment	June 16
Journal of Insects as Food and Feed	Performances of a house fly production system for animal feed in Mali	Nov 16

Poultry Science	The influence of house fly (*Musca domestica*) larvae as a feed supplement on the performance, immunity and	Apr 16
Journal Of Animal Nutrition	Assessing the nutritional value of fly larvae as a source of protein for animal feed	Nov 16
Journal of Chemical Ecology	Identification volatiles from Musca domestica rearing substrates based on wheat bran and test bioactive ingredients in terms of influences on oviposition of female houseflies	Nov 16
Journal of Economic Entomology	The Influence of House Fly Larvae as a Feed Supplement of Huxu Boilers	Mar 16
Journal of Economic Entomology	The new house fly (*Musca domestica*) rearing system in China	Apr 16
Journal of Animal Feed Science and Technology	Maggot meal, a promising feed ingredient for tilapia fingerlings cultured in nursery cages-in-lake in Ghana	Nov 16
Journal of Animal Feed Science and Technology	Assessing the suitability of housefly larvae meal (Musca domestica) as a feed ingredient for Atlantic salmon (Salmo salar) juvenile	Nov 16
Scientific Reports	Microbiota help Musca domestica larvae convert wheat bran	Aug 16
Scientific Reports	Pig manure conversion with larvae of Chrysomya megacephala: risk evaluation of microbiota, heavy metal and green-house gas	Aug 16
Journal of Insect Science	Changes in antioxidative enzyme activity in lead-treated Musca domestica larvae	Sept 16

Preparation

Journal name	Subject or Topic of Publication	Expected publication
PlosONE	Transfer of heavy metals through the chain of manure - housefly larvae - chicken - manure system	Nov 16
	Development and performances of a house fly rearing system in Ghana	Nov 16
	Performance of house fly larvae for catfish production in Mali	Nov 16
Journal of Insect Physiology	Volatile semiochemicals from carrion and waste fish gill for adults of Chrysomya megacephala	Nov 16
Aquaculture nutrition	Application of housefly (Musca domestica) larvae as a feed supplement in the culturing of Litopenaeus vannamei	Aug 16

PROteINSECT

INSECTS AS A SUSTAINABLE SOURCE OF PROTEIN

>1.2M

Website views since March '13

Visits peaked

68.8K

page views in November '15

Twitter followers

1,100+

CBC downloads

3,200+

Facebook likes

950+

>1000 tracked media articles

2 online expert blogs with 20,000 views

Mali film reported on by 14 news outlets

BBC Countryfile reached 7M live viewers

Notable Events

EFSA opinion

Engineering Award

Mali feeding trials film

AgriCulture Toolkit

BBC Countryfile

CommBeBiz Award

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SEVENTH FRAMEWORK PROGRAMME

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration.

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INSECTS AS A SUSTAINABLE SOURCE OF PROTEIN
2014 - 1st CONSUMER PERCEPTION SURVEY

of 1302 respondents...

66% THOUGHT / **6%** DIDN'T THINK

LARVAE OF FLIES ARE A SUITABLE SOURCE OF PROTEIN FOR USE IN ANIMAL FEED

73% WOULD BE / **7%** WOULDN'T BE

WILLING TO EAT FISH, CHICKEN OR PORK FROM ANIMALS FED ON A DIET CONTAINING INSECT PROTEIN

88% said more information should be made available on use of insects as a food source for animals and humans

EATEN INSECTS DIRECTLY THEMSELVES

39% HAD / **43%** HAD NOT

BE STATED ON THE LABEL IF CHICKEN, FISH OR PORK ON SALE FOR HUMANS WAS FED ON PROTEIN FROM INSECTS

57% THOUGHT IT SHOULD / **30%** THOUGHT IT SHOULDN'T

Respondents: 1302
55.9% male - 43.7% female - 0.45% other
The 30-50 age group was the most popular and accounted for 49.9% of replies
Majority of respondents (56.4%) identified themselves as consumers - 29% identified as researchers
Responses came from 71 different countries - top five were UK (27.3%), Mali (8.5%), China (8.2%), Poland (6.7%) and France (6.3%)

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SEVENTH FRAMEWORK PROGRAMME

PROteINSECT

INSECTS AS A SUSTAINABLE SOURCE OF PROTEIN
2015 - 2nd CONSUMER PERCEPTION SURVEY

of 1150 respondents...

ACCEPTABILITY

70%

SAID THAT IT IS TOTALLY ACCEPTABLE/ACCEPTABLE TO FEED INSECT PROTEIN TO FARMED ANIMALS, INCLUDING FISH

COMFORT

66%

WOULD BE VERY COMFORTABLE/COMFORTABLE EATING MEAT FROM A FARMED ANIMAL (INCLUDING FISH) FED ON INSECT MEAL

RISK TO HEALTH

64%

SAID THERE IS NO RISK OR LOW RISK TO HUMAN HEALTH IN EATING FARMED ANIMALS (INCLUDING FISH) FED ON INSECT MEAL

KNOWLEDGE GAP

30%

THE DIFFERENCE BETWEEN HOW KNOWLEGABLE THEY ARE, AND HOW KNOWLEGABLE THEY FEEL THEY SHOULD BE

Respondents: 1150
38% male - 60% female
The 18-64 age group was the most popular and accounted for over 90% of replies
80% of respondents had no dietary requirements - 5% were vegetarian - 5% had food allergies
Majority of respondents educated to at least secondary level - 60% educated to degree level

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