Discovery session: Insects for feed

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Discovery session

- New hot topics
- European scientists play an important role for an improved efficiency of feed products to produce high-quality foods while reducing their environmental impacts
- Three speakers to introduce the topic “Insects for feed”
    - Teun Veldkamp
    - Marian Peters
    - Hannah van Zanten
- A workshop as a start to setting up a cost action proposal – first step identifying knowledge gaps

Discovery session: Programme

14.00 – 14.15	Welcome by Session Chair T. Veldkamp: Insects as a feed ingredient for livestock
14.15 – 15.00	M. Peters (invited speaker): Insects industry – a new circular economy to assure food security
15.00 – 15.15	H.H.E. Van Zanten et al.: Can greenhouse gas emissions be reduced by inclusion of waste-fed larvae in livestock feed?
15.15 – 15.45	Discussion
15.45 – 16.15	Break
16.15 – 17.45	Workshop "Gaps in knowledge to use insects as a feed ingredient" (including preparation of Powerpoint presentation by G. van Duinkerken)
17.45 – 18.00	Conclusions Workshop (G. van Duinkerken)

Insects as a feed ingredient for livestock

T. Veldkamp, G. van Duinkerken

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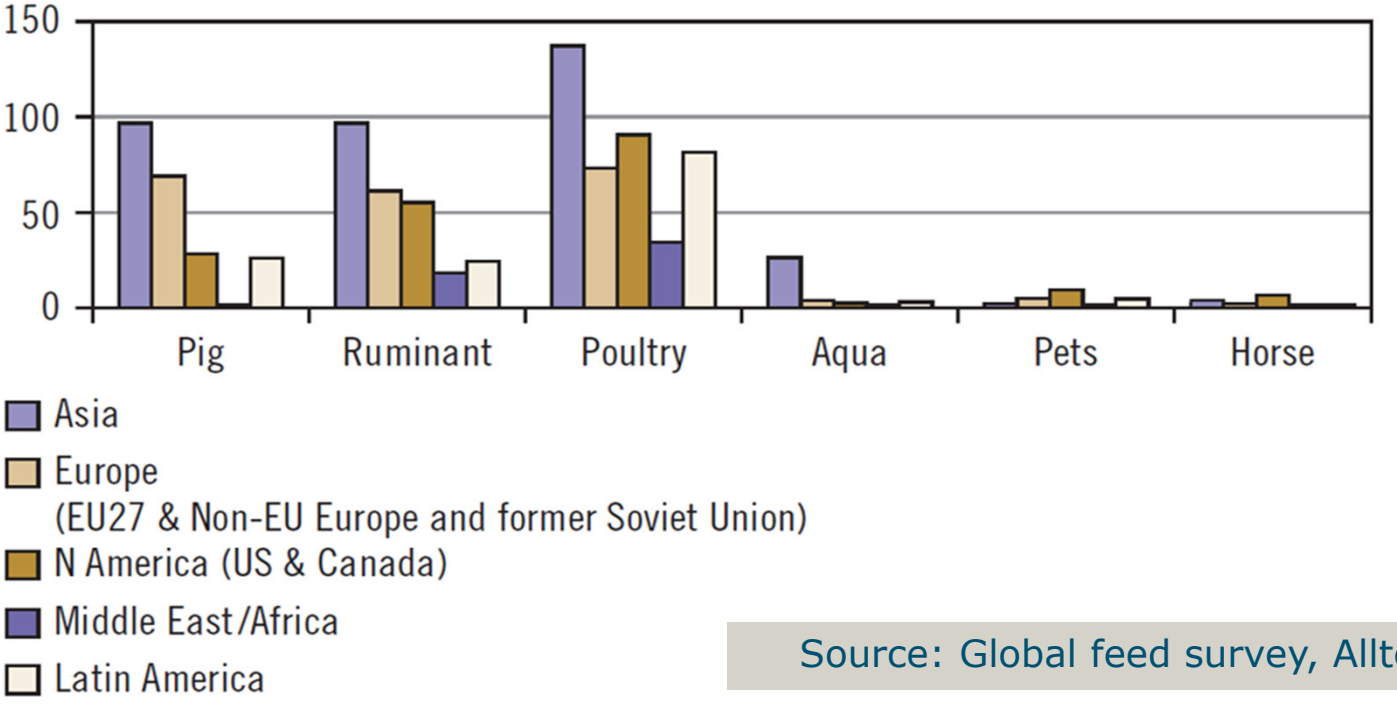
Current global feed consumption

- Estimated: 950 million ton manufactured feed in total
- Prospect: 1500 million ton in 2050

Feed tonnage per region per species (million ton, 2012)



Source: Global feed survey, Alltech 2013

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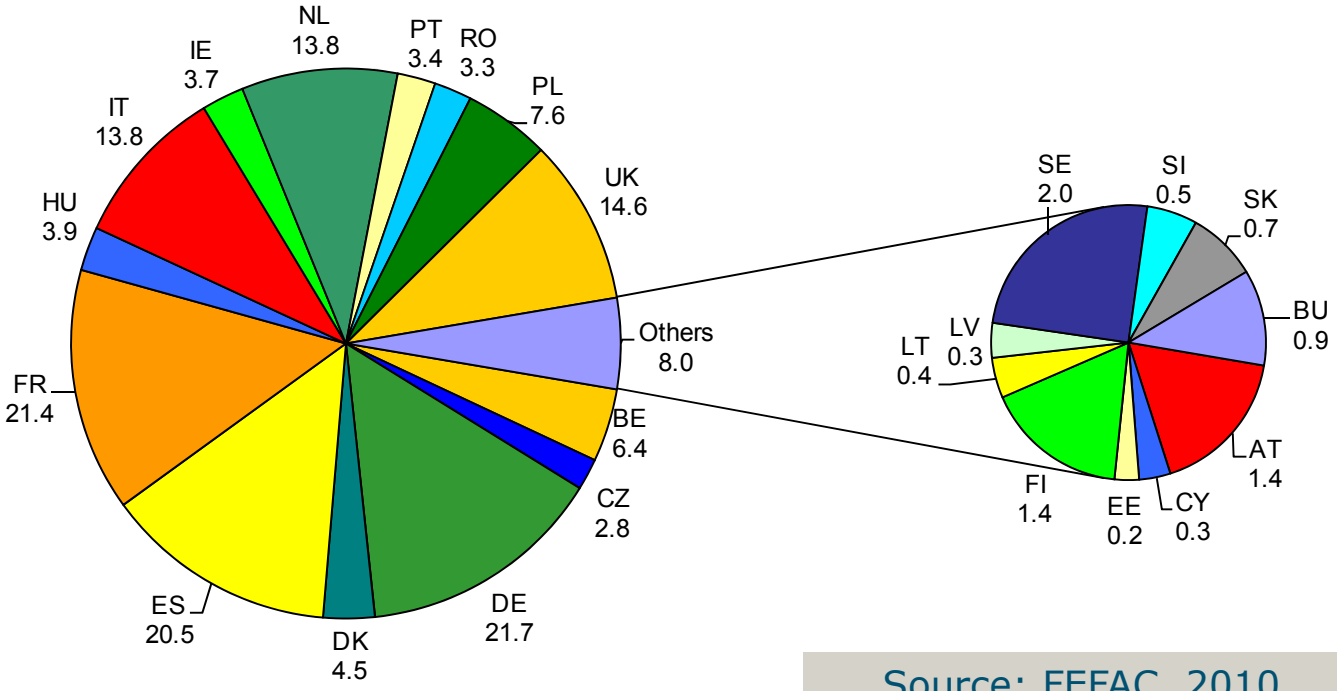
Compound feed production in EU-27

- Estimated at 150 million tons
  - Pig 35%, Poultry 33%, Cattle 25%, Other 7%



Source: FEFAC, 2010

Search for alternative protein sources

- 70% of protein-rich feed ingredients in EU imported !!
  - Pact of "Den Bosch" in the Netherlands: decrease this to 50% in 2020
- Concerns about large imports of soybean products from South-America (42 million ton in 2009):
  - EU: too much dependent from Latin-America (European Parliament)
  - Deforestation of tropical rain forest, loss of biodiversity, soil and water pollution, negative impact on small farmers and native population (NGO's)
  - Societal debate on GMO versus non-GMO crops

Considerations for alternative proteins

- 'Alternative' = replacement of soybean products from Latin America, replacement of fishmeal
- Considerations:
  - Good growth potential under climate conditions in N/W Europe
  - Applicable in diets for (young) pigs and poultry
  - Addition in organic diets allowed
  - Need for further processing?
  - Conflicts with current legislation?
  - Long term availability for feed (vs. food)
  - No focus on ingredients that are already current practice
  - Sustainability aspects (CO_2-equivalents)

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Cultivation, processing and nutritional aspects for pigs and poultry of European protein sources as alternatives for imported soybean products (Van Krimpen et al., 2013)

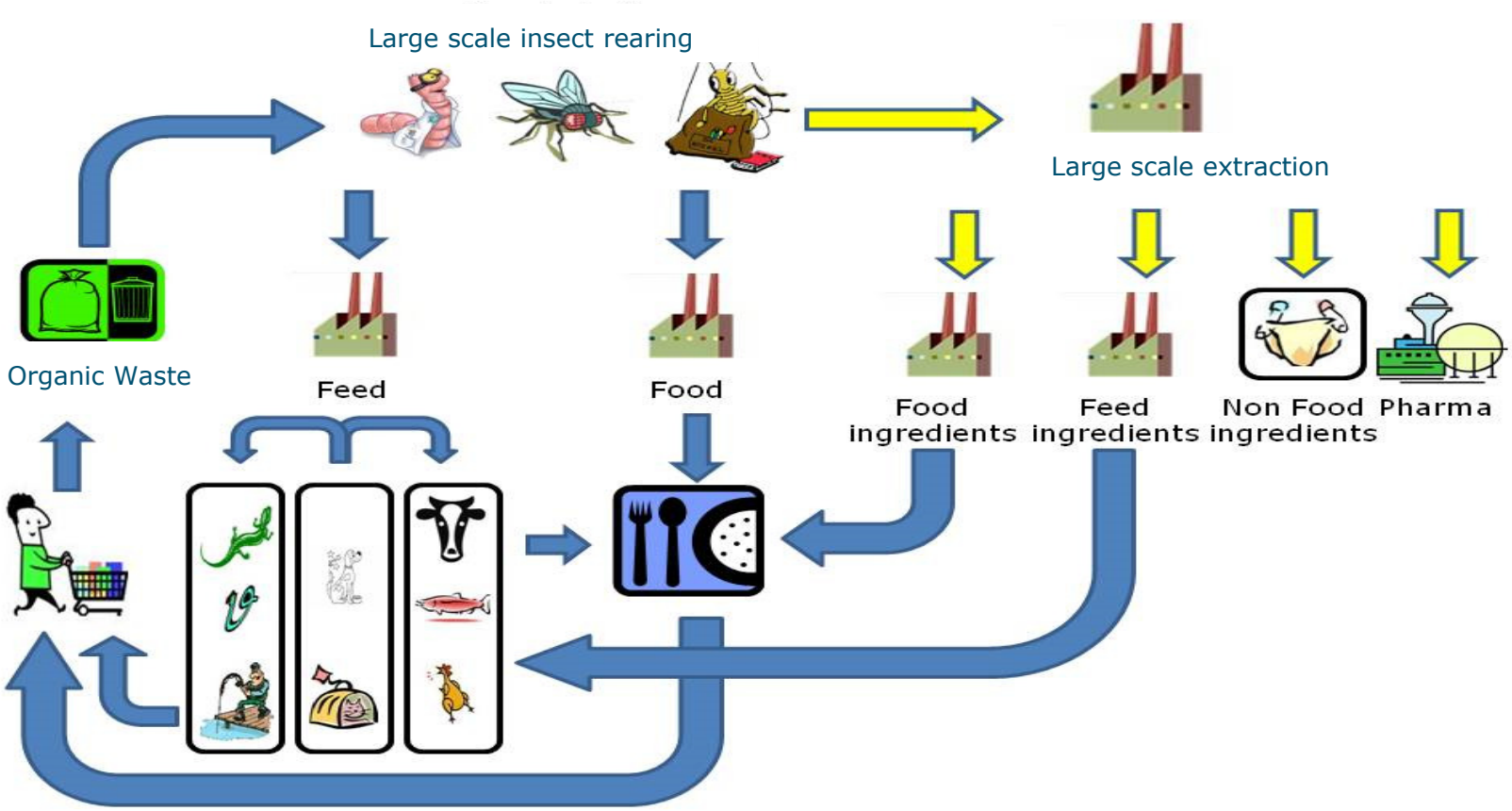
List of ingredients that meet the criteria

Category	Protein source
Oil seeds	Proteins of soybeans, rapeseed and sunflower seed, after oil removal
Grain legumes	Peas, field beans, lupine, chickpeas, and their concentrates
Forage legumes	Lucerne (alfalfa)
Leaf proteins	Grass, sugar beet leaves
Aquatic proteins	Algae, both macro- (seaweed) and microalgae, duckweed
Cereals and pseudo cereals	Protein concentrates from oat and quinoa
Insects	E.g. mealworm, black soldier fly, housefly

Source: Van Krimpen et al., 2013

Insects as a sustainable feed ingredient

- Insects may contribute to a more sustainable animal protein production chain



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Insects as protein source

- Insects are able to grow on waste substrates
- Insects are cold-blooded and efficient in converting substrates into protein
- Insects are protein (and fat) rich ingredients

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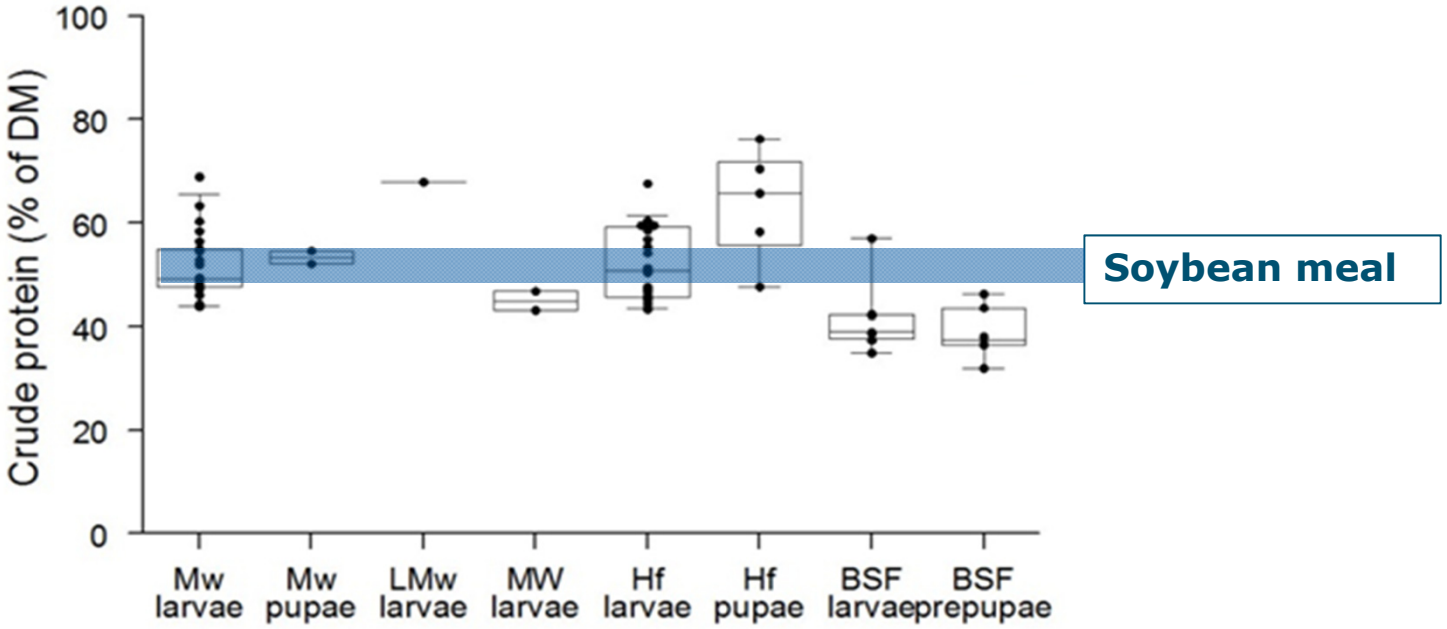
Nutritional characteristics insects



- Crude protein content meal worms and housefly ≥ soybean meal (DM base)
- Dry matter content ranges between 35 – 45%
- Fat content ranges between 4% and 46% of DM

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Cost analyses protein sources (2012)

Protein source	Crude protein %	Cost €/kg product	Cost €/kg protein
Mealworm	50	4,75	9,50
Housefly	65	1,00	1,54
Fishmeal	65	1,24	1,91
Cereals	12	0,14	1,17
Soybean meal	45	0,28	0,62

Conclusions

- Insects are a possible alternative in long term (low land use, conversion of wastes)
  - Need for reducing production costs
  - Legislative aspects
  - Determination of nutritional value
  - Sharing knowledge - Conference: Insects to feed the world and Journal of Insects for feed and food
  - International pre-competitive research projects (Cost action proposal)

Acknowledgement:
all colleagues involved in:

- *Cultivation, processing and nutritional aspects for pigs and poultry of European protein sources as alternatives for imported soybean products* (Van Krimpen et al., 2013)

- *Insects as a sustainable feed ingredient in pig and poultry diets – a feasibility study* (Veldkamp et al., 2012)

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Workshop

Aim: Identification of knowledge gaps for use of insects as a feed ingredient in diets for fish, poultry and pigs and ideas for precompetitive research projects and knowledge sharing, resulting in a COST proposal.

1. Knowledge gaps
   - Related to legislation, food safety issues
   - Related to animal nutrition, nutritional value, bioactive compounds

2. Ideas for collaborative research projects

3. Participation in research projects

G. van Duinkerken will prepare a Powerpoint presentation to summarize the output of the workshop

Brief introduction to COST instrument

COST

Intergovernmental framework for European **Co**operation in **S**cience and **T**echnology, allowing the coordination of nationally-funded research on a European level.

It contributes to **reducing the fragmentation** in European research investments and opening the European Research Area to **cooperation** worldwide.

One of the nine key domains: **Food and Agriculture**

COST invites researchers throughout Europe to submit proposals for **research networks** and use this unique opportunity to **exchange knowledge and embark on new European perspectives**.

A continuous **Open Call** for proposals is used to attract the best proposals for new COST Actions. Each year two collection dates are published on the website.

COST

The average COST Action support is 130.000 EUR per annum, based on a typical participation of 22 COST countries. Funding covers the costs of **networking tools**. **Note that COST does not fund the research itself.**

COST Actions are of scientific importance in their substantial contributions to scientific and technical literature as well as research training and exchanges.

1. Meetings
Meetings are organised by the Management Committee in any COST country participating in the Action. They can be of different types, such as Management Committee meetings, Working Group Meetings, Workshops and Conferences. They are normally open to the whole scientific community and act as a showcase for the Action. COST will contribute to the travel and subsistence costs of participating scientists, and to the organisation costs of the meeting (Local Organiser Support).

COST

2. Short-term scientific missions (STSM)
STSM are missions or exchange visits aimed at strengthening the existing networks by allowing scientists to visit an institution or laboratory in another COST country, to foster collaboration, to learn a new technique or to make measurements using instruments and/or methods not available in their own institution/laboratory. They are particularly intended for young scientists.

3. Training Schools
Training Schools within the context of an Action's topic are aimed at providing dissemination of the Action activities and intensive training in a new emerging subject in one of the laboratories of the Action with unique equipment or know-how. Participants are typically but not exclusively young researchers from across Europe. These schools also cover appropriate re-training as part of 'life-long learning'.

COST

4. Dissemination, Publications

Disseminating scientific results of Action activities is a key value of COST. The aim of COST's dissemination and publication policy is thus to inform the network members, the scientific community, potential beneficiaries and policy makers about the outcome of Actions and their planned programmes and activities.

A series of dissemination channels are available for the COST Actions and can be funded from the COST Office budget such as publications, electronic media, news releases, events, success story releases and e-mail notification.

In our opinion a COST proposal will be impressive when the objectives are based on priorities set by science and industry and as such the EAAP is the perfect instrument

Workshop plenary session

Aim: Identification of knowledge gaps for use of insects as a feed ingredient in diets for fish, poultry and pigs and ideas for precompetitive research projects and knowledge sharing, resulting in a COST proposal.

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3. Participation in research projects - Who is willing to participate in projects?

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