Projects focusing on insects in the food chain in Finland

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Background

• Finland is a net importer of protein

• There is a need to foster domestic protein production and to create value-added products to the industry

• Ethical and ecological aspects related to food protein

• Edible insects and insects as feed has been studied in Europe, but in Finland this research field is new
Import and export of protein in Finland (2013)

8% 0% 83% 30% 25%

Source: Kaukovirta-Norja et al. (2015)
Perceived potential of insects

- Experts foresee that insects, single-cell protein, algae etc. are future sources of protein
- 10+ years
- Insects can produce biomass quickly and use byproducts as their food
- Challenges
  - R & D is needed
  - New business ideas and processing are needed
  - How to keep the production costs low?

Source: Kaukovirta-Norja et al. (2015). Roadmap for improving protein self-sufficiency of Finland
ICOPP focused on larvae as organic feed in pigs

- Larvae of black soldier fly (*Hermetia illucens*) as feed in organic pig production
- Crude protein content about 629-705 g/kg DM
- The study found that larvae meal contains slightly less lysine and about as much threonine as fish meal
- Digestibility of amino acids was lower than that of fish or soybean meal, but higher than that of pea or rapeseed meal
- About one-third of dry matter was NDF fiber (chitin)
Amino acid content g/16 N, larvae

- Lysiini
  - Hermetia: 5.2
  - Fish meal: 7.8
  - Soy meal: 6.2

- Metioniini
  - Hermetia: 1.9
  - Fish meal: 3.0
  - Soy meal: 1.4

- Treoniini
  - Hermetia: 3.9
  - Fish meal: 4.5
  - Soy meal: 4.0

- Valiini
  - Hermetia: 6.1
  - Fish meal: 5.3
  - Soy meal: 4.9

- Kystiini
  - Hermetia: 0.5
  - Fish meal: 1.0
  - Soy meal: 1.3

Source: Kortelainen et al. (2014)
Insect-plant relationships: insights into biodiversity and new applications (FlyHigh)

- FlyHigh studies the life cycles of underexplored phytophagous and saprophagous flies
- Clarifies evolutionary features of fly species and geophyte plants
- Ecology and feeding modes of specialized fly groups
  - Field observations to study flower visits of phytophagous flies and oviposition points (i.e. reproduction aspects).
  - Choose species for rearing under laboratory conditions
- Estimates the evolutionary relationships and phylogeographic patterns of flower flies and their host plants
Flyhigh continued

• Innovative applications for fly biotechnology
  – Characterisation of fly rearing systems used by the SMEs, selection of species and strains, improve rearing systems
  – Develop artificial rearing media
• Potential applications include mass rearing of insects for animal feed, valorisation of agri-food by-products or bio-agents for e.g. complementary pollination services in natural or greenhouse environments
• Partners form Finland (University of Helsinki), Spain, Serbia and South Africa
• http://www.luomus.fi/en/flyhigh
Scenoprot

• A project which will start soon
• One part of this project will examine
  – Changes in legislation regarding insects as food and feed,
  – Insect species which would be suited for rearing
Insects in the food chain (Hyönteiset ruokaketjussa)

- TEKES-funded project coordinated by University of Turku, other partners include Luke and business partners
- This project promotes the development of new bioeconomy-based value chain which utilises insects
- Focus areas include
  - The development of insect-based value chains
  - Exploring the possibilities to use insects as feed and food
  - Consumer acceptance regarding insect-based products
  - Insects as fish and poultry feed (experimental study)
  - Legal framework for insect rearing and anticipated changes
  - Explore the possibilities of mass-rearing of insects
EntoLab

- Project proposal which aims at developing insect rearing technologies and solutions
- Centralised or decentralised production framework?
- Which food safety issues are relevant in insect-based nutrition?
- Use of byproducts in the production process
- Identify useful feeds
- Develop production process and business concept
- Luke, University of Helsinki, SEAMK, Finsect, several other business partners
Further research topics

• Issues related to legal framework
• Issues related to food safety regulations
• Insect rearing as a process
• Mass-reading of (edible) insects
• Biodiversity and protection of wild insects (co-existence, nutrition typical to the species, animal welfare etc.)
• Value-added potential and value chains
• Fostering research dissemination so that new business and opportunities could be identified effectively
Thank you!