

THE INTERNATIONAL PLATFORM OF INSECTS FOR FOOD AND FEED

AgroInsecta '23 'IPIFF and the EU Insect Sector: Overview of the Market and legislative landscape'

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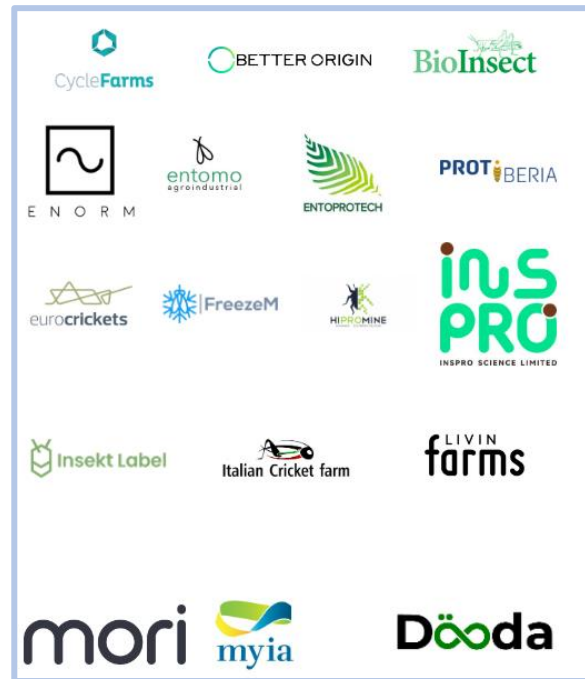
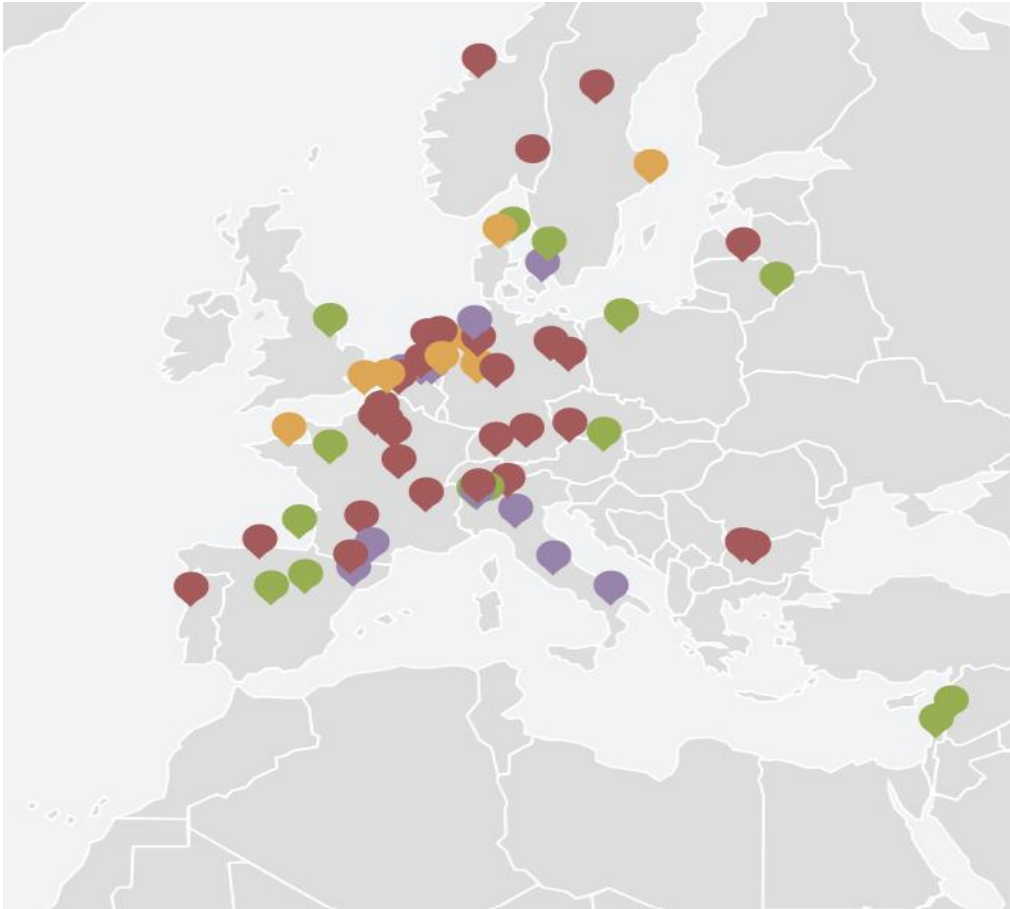


November 23rd 2023

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I. Introduction: IPIFF and the European insect sector



IPIFF missions and activities

76 Members

voice of insect producers

Consolidating dialogue

with EU public authorities

Advocating

for appropriate legislative frameworks

Support

in the effective implementation of legislation

Promotion and development

of shared standards and best practices

Collaborative actions

with other umbrella associations



Current state of development of the European insect sector

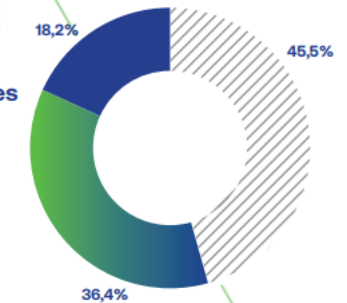
- More than **EUR 1,5 bln investments** until now: the sector is predominantly composed of SMEs.
- The sector has passed a **critical threshold** and has set its mark to **be commercially interesting**.
- **Production is scaling up** to meet the needs of food-feed-plants markets, while building up **know-how**.
- **Diversity in types of farms, operational sizes and production models** (e.g. 'full liners' vs. decentralized models)
- **Higher level of integration** with several other **production systems** (e.g. 'colocation' with agro-industries, partnerships with farmers)

- **3,5 thousands jobs created until today** (incl. above 1,000 direct jobs).

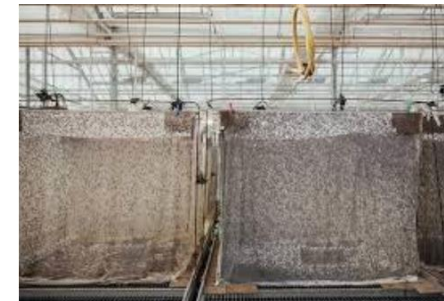


Insect feed producing companies' profiles and employment

Insect feed producing companies by size (in 2023)



(Source: IPIFF questionnaire - February 2023)



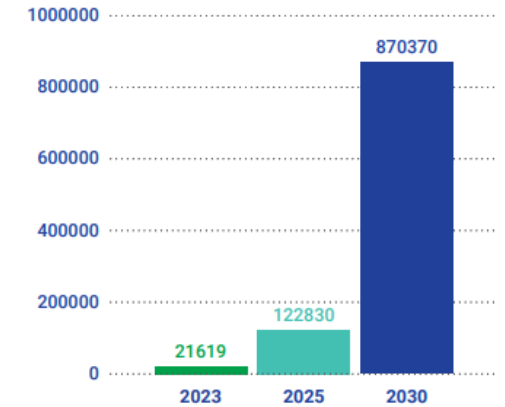
Perspectives on the development of the European insect sector towards 2030

The recent evolutions experienced by European insect producing companies are now shaping their ability contributing to **addressing the current deficit in EU domestic protein production** (both for food and animal feed).

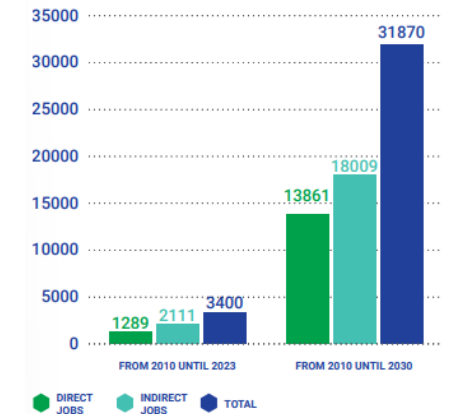
- by the end of the decade, there will be a significant spike in the **number of insect farms producing above 10,000 tonnes per annum**, thereby developing large-scale operations;
- The number of **European livestock farmers, who decide to diversify their commercial activities towards insect production**, will be increasing.



EVOLUTION OF ALL INSECT-DERIVED FEED PRODUCTS



TONNES OF INSECT PROTEINS PRODUCED BY IPIFF MEMBERS IN 2022

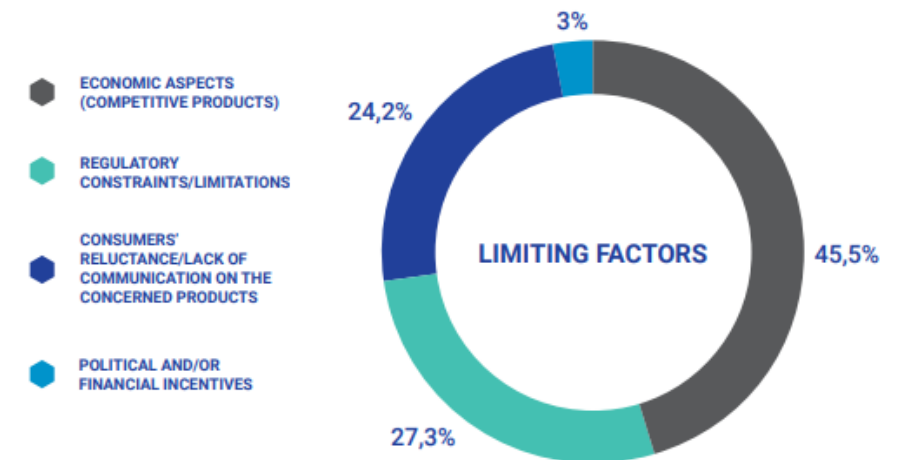


JOBS (I.E. DIRECT & INDIRECT JOBS) CREATED BY INSECT-PRODUCING COMPANIES SINCE THEIR INCEPTION AND FORECASTS FOR 2030

(Source: IPIFF Questionnaire—February 2023)

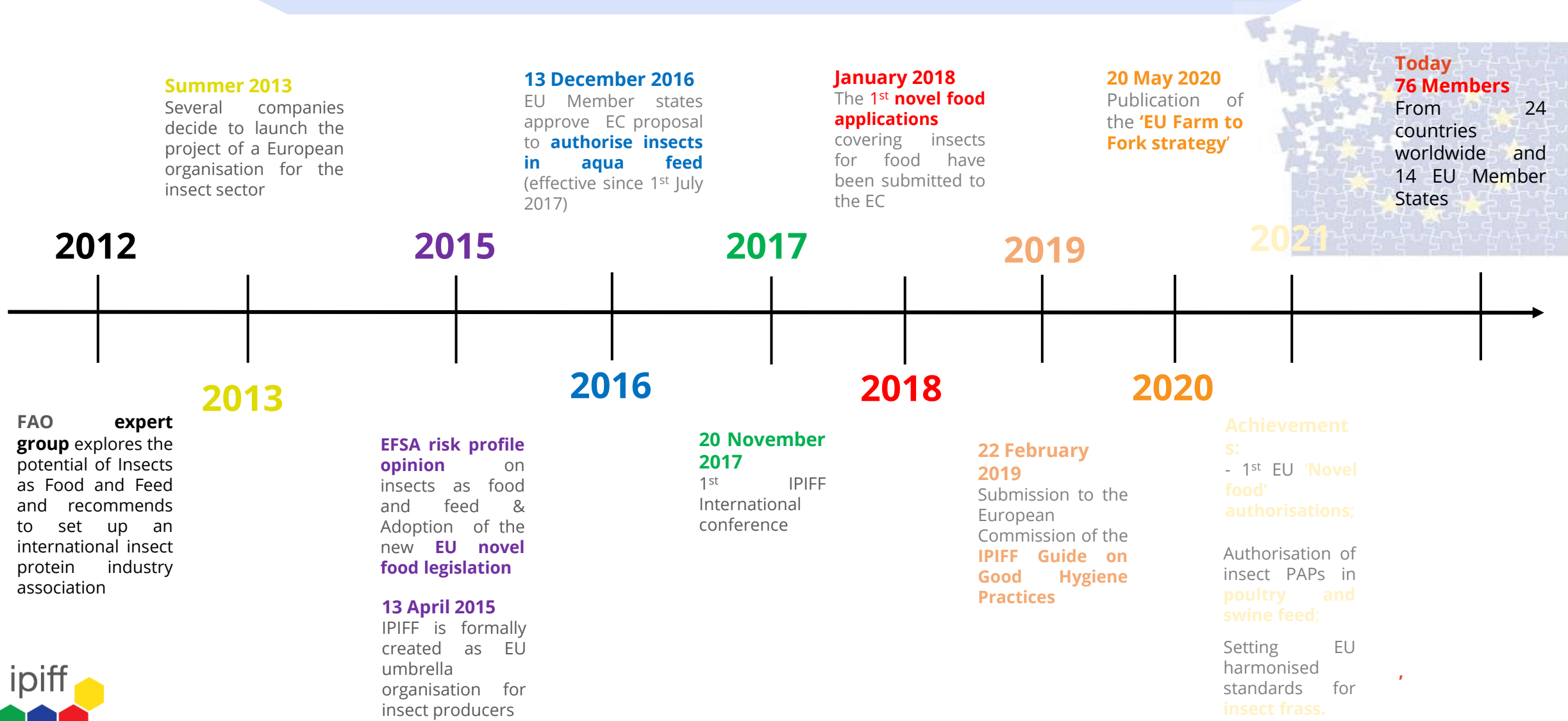
Main challenges ahead of the sector

- **Scaling up of production** remains the **main challenge of the insect sector** at the moment.
 - Economy of scale shall be fuelled through substantial investments in breeding and processing technologies
- Efforts to **document** and **communicate on insect production credentials** should be stepped up.
 - Such efforts would provide an incentive for European feed manufacturers, farmers and consumers to prioritise the use of such food or feed sources.
- **Regulatory constrains (...)**



(Source: IPIFF Questionnaire—February 2023)

EU Regulatory bottlenecks and opportunities milestones for the European insect sector



II. Current Legislative framework



The EU regulatory status of insect farming

- Farmed insects are considered ‘**farmed animals**’:
...insects farmed in the EU for the production of food, feed or other purposes are ‘farmed animals’
(Regulation (EC) No 1069/2009 on Animal by-Products);
- Insect farming **is** an **agricultural activity**, as insects are covered (as ‘animal products’) in Annex I of the TFEU;
- Thus, insect farming activities **do** fall under the scope of ‘**EU Agricultural rules**’ (e.g. EU organic legislation, Rural development programs under the Common Agricultural Policy).



Requirements on substrates of animal origin as feed for insect

- Insects reared within the European Union fall within the category of **'farmed animals'** as defined in the EU Animal By-Products' (ABP) legislation (i.e. Article 3(6) of Regulation (EC) No 1069/2009);
- Regulation (EC) No 767/2009: animals in the EU may be only be fed with safe feed - **prohibition feeding faeces and separated digestive tract content**;
- Regulation (EC) No 999/2001 prohibits to feed insects with **any PAPs**, except fishmeal
- Regulation (EU) No 142/2011 (annex X, section 10) **excludes former foodstuffs containing meat and fish.**



Substrates for insects intended for all applications (food, feed, technical uses) - Farmed insects qualify as 'farmed animals' - Article 3(6) of Regulation (EC) 1069/2009	
Authorised	Prohibited
<p>Feed materials of vegetal origin </p> <p>Feed materials of animal origin </p> <p>Former Foodstuffs </p>	<p>'Feed Marketing' Regulation - Regulation (EC) No 767/2009 Annex III:</p> <ul style="list-style-type: none"> - Faeces and separated digestive tract content - hide treated with tanning substances - seeds and other plant-propagating materials (treated with plant protection products) - wood and their derived products - waste derived from urban, domestic and industrial waste treatment - packaging from agri-food products and parts thereof - protein products obtained from yeasts of the Candida variety cultivated on n-alkanes. <p>EU Animal By-Products (ABP) Regulation (EC) No 1069/2009:</p> <ul style="list-style-type: none"> - catering waste (Art. 11 (1) (b)) - Insect PAPs derived from animals of the same species (Art. 11 (1) (a)) E.g. feeding of black soldier flies with PAPs derived from that same species. <p>TSE legislation - Regulation (EC) No 999/2001:</p> <ul style="list-style-type: none"> - Processed Animal Proteins (PAPs), blood products - Collagen - Gelatine - hydrolysed proteins of animal origin and derived from ruminants (annex IV, Chapter 1 and 2).
<p>Residue limits for contaminants and requirements applying to feed additives</p>	<p>The 'Feed Marketing' Regulation (i.e. Regulation (EC) No 767/2009) provides that animals (including therefore insects) bred in the EU may be only be fed with safe feed.</p> <p>Regulation (EC) No 396/2005 - maximum residue levels of pesticides in feed</p> <p>Undesirable Substances Directive (i.e. Directive 2002/32/EC)</p>
<p>Feed additives </p>	<p>Only the feed additives which are authorised for all animal species may be used as feed ingredient for insects. - Regulation (EC) No 1831/2003. No specific additives for insects have been defined.</p>

Insect as food : Novel Food authorisations



- **20+ ‘novel food’ (NF) applications** transmitted for evaluation to the European Food Safety Agency, with **13 ongoing applications, out of which:**
- **Seven EFSA opinions** on *Tenebrio molitor* (13 January 2021), *Locusta migratoria* (2 July 2021), *Acheta domesticus* (17 August 2021), the second on *Tenebrio molitor* (25 August 2021), partially defatted *Acheta domesticus* (13 May 2022) *Alphitobius diaperinus* larva (4 July 2022), *Lesser mealworm* (4 July 2022) and on *yellow mealworm* (1 June 2023);
- **Six authorised insect NF products.** The products covered by these opinions (except the last one) have been authorised for commercialisation on the EU market (green light given by the EU Member States).

EU baseline standards for insect frass

- Regulation 2021/1925 setting **EU standards for insect frass** (i.e. heat treatment of 70 ° C for at least 60 minutes, setting of microbiological standards) entered into force on 28 November 2021.
- The EU legislator also introduced a **definition for 'frass'**: *mixture of excrements derived from farmed insects, the feeding substrate, parts of farmed insects, dead eggs and with a content of dead farmed insects of not more than 5% in volume and not more than 3% in weight.*

Fact sheet on insect frass



1. What is frass?

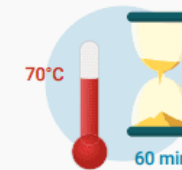
The recent reform of the **European Union (EU)** legislation on animal by-products is of significant relevance for the European insect sector, as it integrates the **first standards for insect frass** as fertilising product in agriculture. Building on the latest technical knowledge, these new norms should facilitate the development of a **level playing field** across the Member States (MS) of the EU by harmonising the processing conditions used for insect frass. In parallel, the EU legislator has **created a definition for insect frass** – an element of crucial importance in this process.

'61. Frass' means a mixture of excrements derived from farmed insects, the feeding substrate, parts of farmed insects, dead eggs and with a content of dead farmed insects of not more than 5% in volume and not more than 3% in weight.

source: Commission Regulation (EU) 2021/1925.

Regulatory context

The first EU standards for the placing on the market of processed insect frass follow the discussions between Member States' experts and EU Commission officials (the legal text was then formally endorsed by the Council of the European Union and the European Commission in accordance with applicable EU procedures). The recently adopted piece of legislation amends the Annex I and Annex XI of Regulation (EU) No 142/2011, by aligning the standards for the placing on the market of frass with those applying to processed animal manure. More specifically, frass treated at 70 degrees Celsius for one-hour (i.e. complying with the above-definition and the relevant microbiological standards from Annex XI, Chapter I, section 2 d) will be allowed on the markets of EU Member States, in line with the national authorisation procedures.



While frass was already subject to certain authorisation procedures at national level (i.e. before the entry into force of this text), the EU legislator foresees a transitional measure in order to assist operators in complying with these new norms at Union level (more information in 'section III').

What is the objective of this factsheet?

This document aims at presenting an overview of the latest regulatory changes related to the use of insect frass as fertilising product in agriculture. Complementary, this document will also present an overview of the **benefits of insect frass** (section II), the **implications** of the latest legislative reform (section III), as well as a quick summary of **manufacturing practices** followed by insect producers (section IV).

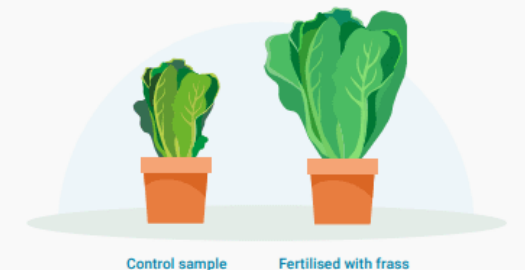
2. What are the benefits of insect frass?

Similar to compost or other types of animal manure, frass is a valuable by-product derived from insect farming activities. The **application of frass on agricultural land** is consistent with the principles of circular economy: closing the loop of insect farming by **reintroducing relevant nutrients and organic matter** in the soil. The valorisation of frass as fertilising product makes insect farming a 'zero waste' activity. Moreover, frass has product proven benefits on soil and plant health, such as those listed below.

01 ...provides macro- and micro-nutrients to the soil: from a chemical point of view, frass has concentrations of N, P and K similar to those found in animal manure (e.g. poultry manure). Studies and trials confirm its high potential as fertiliser material, providing minerals that are easily assimilated by the plants. Thanks to the presence of nutrients in a readily available form, insect frass is an efficient natural NPK fertiliser. It increases the biomass and the nutritional content in crops such as **vegetables** (e.g. lettuce), grains (e.g. barley, wheat, maize, rapeseed) and **specialty crops** (e.g. vineyards). The addition of frass provides for a slow release of nutrients ensuring efficient use of micro- or macro-substrates.

02 ...supplies organic matter that enhances microbiological activity in soil: as frass consists primarily of organic matter, its application improves the soil organic carbon content – as well as other relevant soil parameters, such as water holding capacity. In addition, the use of insect frass as organic fertiliser in agriculture adds beneficial microorganisms and biomolecules relevant for soil and plant health.

03 ...increases plant tolerance to abiotic stresses and resistance to pathogens: due to the presence of different compounds and microorganisms, the application of frass increases the tolerance of the seedlings against stress factors such as drought, flooding, and salinity. In addition, several studies highlight the role of frass in activating plant defence responses – while also inhibiting the growth of certain pathogenic fungi. Such mechanisms are believed to be linked to the presence of chitin (i.e. the main chemical from the exoskeleton on insects – and the second most abundant biomolecule in the world, after cellulose). Lastly, it has been hypothesized that frass showed insecticidal qualities because it was proven to reduce wireworm populations.



EU regulatory possibilities for using farmed insects in animal feed

Feed stocks

- ✓ Vegetal substrates
- ✓ Former foodstuff: vegetal, dairy and eggs

Insects as feed - Regulation (EU) No 68/2013 on the Catalogue of feed materials	Ruminant animals	Aquaculture	Poultry	Pigs	Pets	Fur and other animals (e.g. zoo)	Technical uses (e.g. cosmetic industry, bio-based fuels, production of other bio-based materials such as bioplastics)
Insect proteins (under entry 9.4.1. 'Processed animal protein')	✗	✓ **	✓ **	✓ **	✓	✓	✓
Insect fats (under entry 9.2.1 'animal fat')	✓	✓	✓	✓	✓	✓	✓
Whole insects (untreated) (under entry 9.16.2. 'terrestrial invertebrates, dead')	✗	✗	✗	✗	✗	✓ *	✓
Whole insects (treated- e.g. Freeze drying) (under entry 9.16.2. 'terrestrial invertebrates, dead')	✗	✗	✗	✗	✓ *	✓ *	✓
Live insects (under entry 9.16.1 'terrestrial invertebrates, live')	✗	✓ *	✓ *	✓ *	✓ *	✓ *	✓
Hydrolysed insect proteins (under entry 9.6.1. 'Hydrolysed animal proteins')	✓	✓	✓	✓	✓	✓	✓

*If authorised by the national competent authority of the country where the product is being commercialised.
 ** Limited to Black Soldier Fly (Hermetia illucens), Common Housefly (Musca domestica), Yellow Mealworm (Tenebrio molitor), Lesser Mealworm (Alphitobius diaperinus), House cricket (Acheta domestica), Banded cricket (Gryllodes sigillatus), Field Cricket (Gryllus assimilis) and Silkworm (Bombyx mori).

Restriction to insect species (insect PAPs for aqua feed) - Regulation (EU) No 142/2011, Annex X Chapter 2 Section 1, A (2).
 - Insect PAPs must be produced in **processing plants approved** in accordance with Article 24(1)(a) of Regulation (EC) No 1831/2003 and **dedicated exclusively** to the production of products derived from farmed insects. **Regulation (EC) No 999/2001, annex IV, Chapter III, Section F, 1 (a)**
 - Insect PAPs must be produced according to **processing methods 1 to 5** or **processing method 7** (Regulation (EU) No 142/2011, Annex X, Chapter II, Section 1, B (2)).

No restriction as to the insect species (provided that these are not pathogenic to humans and animals)

Legend: Overview of EU regulatory possibilities for feeding whole insect larvae to farmed and non-farmed animals.
[*IPIFF Guide on Good Hygiene Practices*](#)
 (updated version November 2022)
 (p 25)



III. Legislative framework: Unlocking new opportunities



EU Policy Context: Agri-food Challenges



59 million tons of food waste / year in the EU, the equivalent of **131 kg/inhabitant** (*Eurostat, 2020*)



The COVID-19 pandemic and the Russian aggression in Ukraine highlighted **vulnerabilities in EU food supply chains** (e.g. fertilisers)



Efforts are necessary to **accelerate the transition** towards **more sustainable** diets and **increase domestic production** of key commodities

I. What we advocate: Insects...connecting the dots

INSECT FARMING PROVIDES SOLUTIONS TO KEY EUROPEAN AND GLOBAL CHALLENGES




A. food waste  **Insects' contribution to the EU food Waste Reduction Targets**

'...about 20% of the food produced is wasted...'

About 30% of the food waste generated in the EU could be suitable for insect farming activities.



B. reliance on food imports  **Insects' contribution to the EU Contingency Plan on Food Supply and Food Security**

Insects can reduce dependency of imported protein for both food and feed



C. feeding a growing population, while not at the expense of agricultural land

'...68% of the total agricultural land is used for animal production.'

 **Insects' contribution to the Sustainable Food System Framework**

Insect farming activities are based in circular practices upcycling what would be considered food waste into valuable protein sources. In addition, it requires less land and water consumption and reduced green gas house emissions

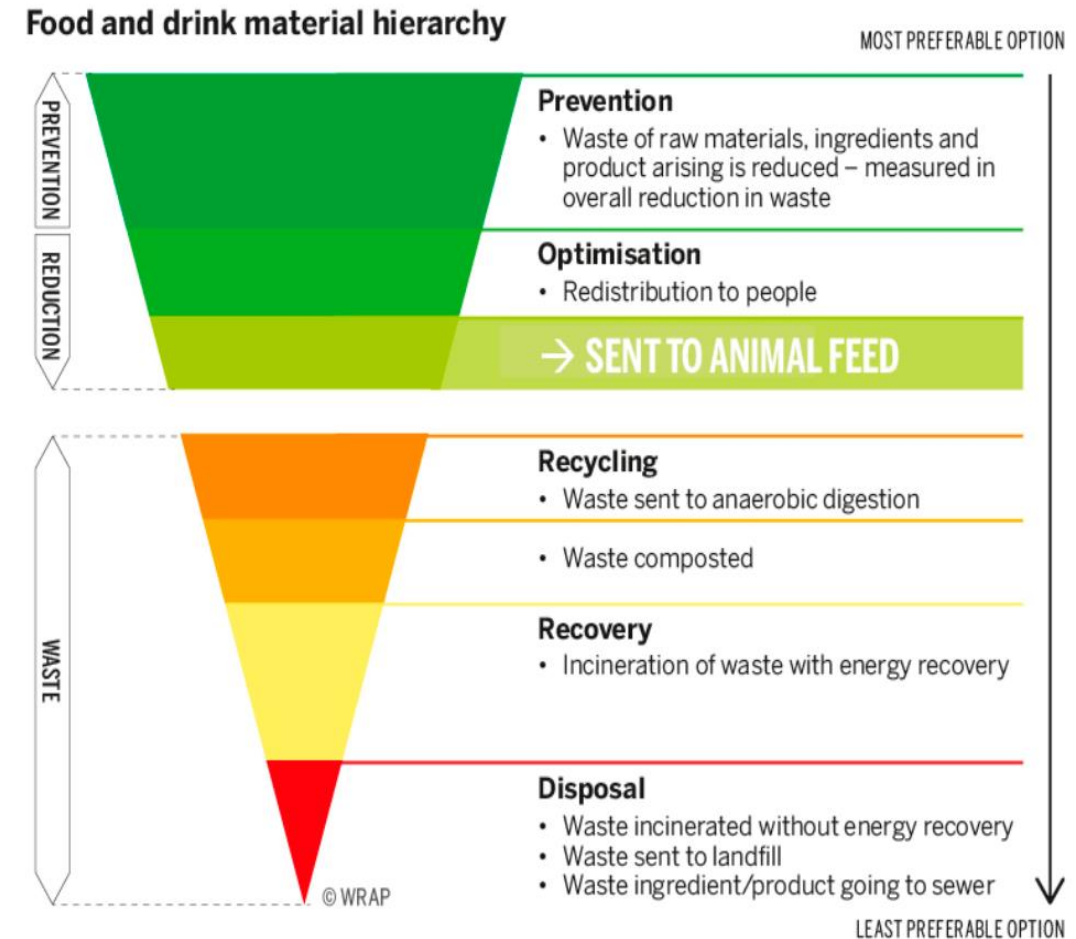
Supporting the EU 'Farm to Fork' Strategy

- The EU 'Farm to Fork' strategy (published in May 2020) aims to make Europe the global **pioneer of a food system that is fair, healthy and environmentally-friendly**.
- The strategy lays down the following **targets**:
 - Reducing the use of **fertilizers** by **20%** by **2030**;
 - Reducing food waste by **50%** by **2030**;
 - Reducing **nutrient loss** by at least **50%** by **2030**;
 - Ensuring that **25%** of agricultural land is under organic farming by **2030**
- ...'fostering EU-grown plant proteins as well as alternative *feed materials such as insects*' ...;
- *A key area of research* will relate to (...) increasing the availability and source of alternative proteins such as plant, microbial, marine and *insect-based proteins*.' ...;



EU opportunities for authorising ‘new feeding substrates’

- Diversifying the spectrum of authorised substrates used in insect farming is considered as key to **reducing the footprint** of insect farming activities while representing a promising opportunity for **tackling the problem of food waste**.
- **About 30% of the food waste** (e.g. former foodstuffs, catering waste) generated in the EU could be suitable for insect farming activities.
- *‘IPIFF wishes to explore the possibilities for authorising former foodstuffs containing meat and fish and catering waste as insect feeding substrate (IPIFF Regulatory Brochure, May 2020).*

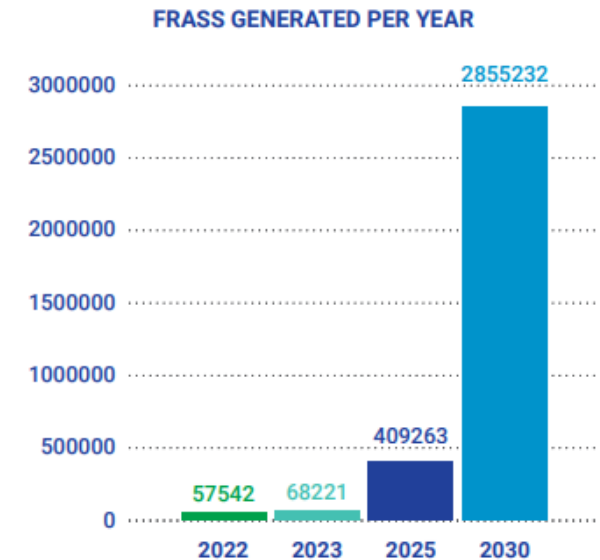


<https://www.elfpa.eu/reducing-food-waste/>

Maximising the contribution of the insect sector towards a decarbonized economy: insect frass

'The Commission will furthermore look into measures that can help make green fertilisers competitive in the market during the transition to a fully decarbonised economy (...)' The forthcoming definition of end-points in the manufacturing chain under the ABP Regulation - a pre-condition for the market access granted by FPR - will constitute important further progress (...)'. [EC Communication – 09 November 2022](#)

The European Parliament considers that frass is *'currently not used to the fullest (and) 'calls on the Commission (...) to incentivise the use of frass by removing unnecessary legislative and administrative burdens as soon as possible'* ([EP Resolution 16 February 2023](#))



QUANTITIES OF INSECT FRASS IN TONNES FROM 2022 UNTIL 2030

(Source: IPIFF Questionnaire—February 2023)



Addressing current bottlenecks

- Registration of processed insect frass under the EU fertilisers legislation, thereby giving full EU market access for the use of insect dejecta as a fertilising product (reform expected by end of 2024-1st half of 2025);
- Setting EU regulatory standards for insect organic production and authorisation for using conventional insect proteins in organic aquaculture (new rules could be in place as from the end of 2024 - 1st half of 2025);
- European Commission proposal in view of including more feeding substrates to be legally applicable for insect farming (e.g. meat and fish containing former foodstuffs, depending on the final conclusions of a future food safety assessment to be conducted by the European Food Safety Authority; the European Commission may table a regulatory proposal by early 2026).

Be ambitious and committed

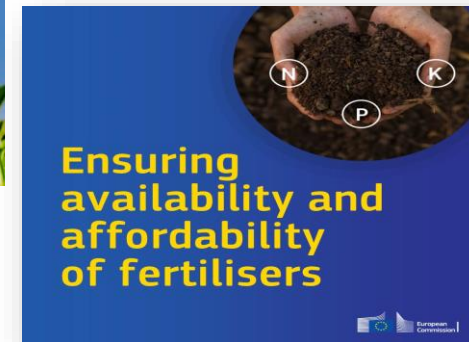
IPIFF President, Adriana Casillas 'The European insect sector has the potential to tick both boxes: Our members are committed to contributing to the realisation of the EU sustainability targets, whilst meeting its newly defined objectives towards achieving greater food security' (source: IPIFF brochure, November 2023)



'Think outside the box'

Adopt a **holistic approach** and deploy **ambitious actions**

- ✓ The 'next' CAP shall include agri-environmental measures targeting **diversification initiatives towards insect production**
- ✓ Devising of **future-oriented research projects**, where insects can bring added value in addressing key challenges (e.g. food waste, soil fertility, human and animal health)
- ✓ Explore opportunities opened under the **EU Protein strategy**
- ✓ The future **EU Agri-food promotion policy** should cover
- ✓ alternative sources of proteins
- ✓ **EU Cohesion policy**
- ✓ How to support the **EU efforts** towards a **decarbonised economy** (EC Communication from 09-11-22)



Thank you!

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