



The International Platform
of Insects for Food and Feed

**The insect sector milestones
towards sustainable food
supply chains**

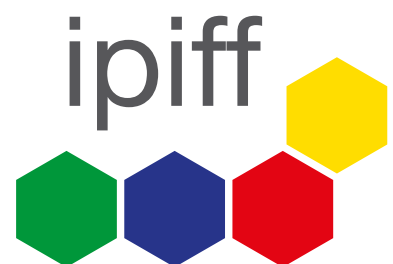


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The insect sector milestones towards sustainable food supply chains

IPIFF Policy priorities towards 2025

Developed by the IPIFF Secretariat with the support of the IPIFF members, this document illustrates a list of policy priorities of relevance for the insect sector. On the one hand, these targets reflect previously-defined objectives of the insect sector – on which discussions with the EU legislator are ongoing. Conversely, throughout this document, we wish to highlight elements which – in our view – could play a concrete role in materialising the transition towards more sustainable food systems, in line with the ‘Farm to Fork’ and ‘Green Deal’ objectives.

The vast majority of these topics were previously presented in the [IPIFF Vision Paper](#) or summarised in the [IPIFF Position Paper](#) on the ‘Farm to Fork’ strategy - document developed as part of the public consultation on the priorities of this EU initiative. However, in contrast to the above publications, in this brochure we highlight certain subjects which – in our view – could bring a concrete contribution to the objectives of the ‘Farm to Fork’. Yet, materialising these objectives depends on unlocking certain regulatory opportunities.

This brochure consists of two main parts:

- A **general introduction**, presenting the potential of the insect sector to meet the main objectives as outlined in the ‘Farm to Fork’ strategy;
 - Six **thematic chapters**, which cover elements presented in the ‘Green Deal’ Communication, or targets presented by the European Commission prior to the launch of the ‘Farm to Fork’, notably:
1. ‘Establishing a tailored EU Regulatory framework for insects as food and feed’, outlining the IPIFF views regarding the development of specific **EU insect food standards**, while further exploring several options for **‘unlocking’ EU regulatory opportunities** for using insect products in animal feed.
 2. ‘Maximising the circularity potential of the insect sector’, anticipating opportunities for **upcycling underexploited biomass** through insects, as well as different possibilities for **valorising insect end-products** in technical applications.
 3. ‘Edible insects – sustainable and healthy solutions for a balanced European diet’, explains how consumer information could play an important role in the transition towards healthier and more sustainable diets. In particular, future national or European **dietary guidelines shall take into consideration the potential of insects in tackling nutrient deficiencies**, but also to **complement diets low in protein**.
 4. ‘Responding to the growing demand for EU organic products’, providing arguments in favour of the approval of insects as feed for organic aquaculture, poultry or pig farming, while engaging into future-oriented dialogue on the development of **organic standards for insect farming**.
 5. ‘Recognition of new food and feed sources under EU strategic frameworks’, emphasising the need to stimulate the production of new food and feed materials (such as insects, but also algae, microbial culture, fermentation products) as a key step to ensure coherence between the ‘Farm to Fork’ strategy and other national/EU initiative. Further exploring synergies between these sectors - through EU policy frameworks such as **the Common Agricultural Policy**, the **Horizon Europe research framework programme**, or **national protein plans** - will ensure that the gap between innovation and implementation is narrowed.
 6. ‘Commitments of the insect sector towards the establishment of baseline standards at an international level’, presenting how IPIFF contributes to the development of aligned standards for insect farming at an international level.

What is 'insect farming'?

Insect production is an emerging sector across Europe and has the potential to become a **strategic link between EU's food and feed chains**. Over the last decades, several 'pioneers' - mostly startups and SMEs - made the choice to launch the production of insects¹ so as to provide more diverse local opportunities with respect to locally produced, high-protein food and feed ingredients. Presently, black soldier fly (*Hermetia illucens*), mealworm (*Tenebrio molitor*) or house cricket (*Acheta domesticus*) are among the most commonly reared insect species in Europe. Depending on the market targeted, insects are used as whole or incorporated into diverse food products (such as protein bars, bakery, or pasta) or compound feed. Insects indeed constitute a **valuable complementary source of proteins and nutrients for humans**, while they **provide highly nutritious solutions to European livestock and aquaculture producers** who are seeking new protein sources to complement animal feed ratio and improve local self-sufficiency².

From innovative biocontrol enterprises to ingenious food and feed pioneers, several industrial projects have emerged around the globe (e.g. Southeast Asia, US and Canada). Presently, **Europe is a leader in terms of industrial and technological advancement in the area of insect production**¹.

Commercial production of insect proteins for fish and pet food - today the two main outlets for European insect feed producers - **started a few years ago**. According to an internal IPIFF survey, more than 5.000 tonnes of insects have been commercialised by European insect producers since July 2017, once the EU authorisation for using insect proteins in aqua feed became effective¹. IPIFF forecasts that the sector will achieve **much significant volumes in the next few years**, with an estimated 3 million tonnes produced by 2030³, out of which circa 10% produced for food applications.

This will be achieved by scaling up production: by September 2019, more **than 600 million EUR have been invested by European insect producers** in the deployment and scaling up of their production facilities. According to IPIFF forecast, more than 2.5 billion EUR will be invested by the mid-2020s.

The potential economic and commercial development of the insect sector in Europe is significant:

- While traditionally, insects are widely farmed and consumed in certain regions of the globe (e.g. Southeast Asia, Mexico, Africa), insects constitute a **'largely unexplored' market in western countries**.

European consumers' attitude around food is gradually changing⁴ - while the demand for high protein targeted nutrition food⁵ is also growing. In 2019 about 500 tonnes of insect-based food was produced. These 'niche markets' (today) are expected to grow rapidly in the next few years⁶. At the same time, European livestock producers are confronted with a problem of protein deficit. While the EU is not self-sufficient in the supply of animal feed ingredients¹¹ (i.e. high protein materials) to respond to current meat protein demands in Europe, insect production represents a valuable solution⁷ for this growing demand.

These new trends are creating opportunities for insect food producers. Insect-based food does not only contain high sources of proteins, but also valuable nutrients for humans, prebiotic fibres and healthy fatty acids⁸¹¹¹.

Similarly to the edible insects, insect feed materials provide farmed animals with numerous nutritious elements, essential in different stages of development. 'Moreover, their amino acid profile^{1V} corresponds to the dietary needs of fish, poultry or swine animals, with adequate levels of amino acids which are seen as limiting factors'. Of particular attention is the presence of antimicrobial peptides found in larvae, which are currently evaluated for their potential in the development of novel antibiotics. Thanks

1 The concept of 'insect production' includes both insect farming and insect processing (e.g. into food or feed products).

2 In terms of farmed animals targeted by insect feed producers, we note the importance of aquaculture species, poultry or pigs (e.g. non-ruminant animals).

3 The IPIFF protein forecast for 2030 includes three scenarios. Depending on how the regulatory framework will evolve, the 'realistic' scenario indicates that up to 3 million tonnes will be produced - the 'optimistic' case shows that this figure could reach 5 million tonnes by 2030 - for further information, please consult the IPIFF Vision Paper (references).

4 Numerous factors play an important role in this regard, such as emerging concerns on the environmental footprint of our food and its 'invisible costs', its health effects, animal welfare considerations - e.g. as illustrated by flexitarian or paleo movements.

5 Sports nutrition, high-protein diets, maternal and child nutrition, healthy ageing.

6 IPIFF will soon (June 2020) release a factsheet on the market for insects as food.

7 Circa 71% of the high-protein (30-50% protein content) feed materials are of imported origin. Overall, EU's non-roughage feed protein self-sufficiency is circa 60% (with a total self-sufficiency at 77%).

8 Notably, edible insects are rich in vitamins (e.g. B12), trace elements (e.g. Fe, Mg, etc.), etc.

to their immuno-stimulatory characteristics, such peptides are considered important in transitioning towards a reduction in the use of synthetic antibiotics⁹.

Being a **pioneering industry**, insect production should be seen as a **'strategic' sector** by European policymakers. This innovative sector **offers promising solutions to global challenges**, including a growing population, limited natural resources and food waste mitigation. Along with other new protein sources, insect production is also - in our view - part of the solution in the **transition towards more resilient and sustainable food production systems**, at three different levels:

- At EU level, insect production should be included under the national strategies aiming at boosting **the development of locally produced proteins** – elements of particular relevance in the context of EU's deficiency in high protein products;
- Based on **circular principles**, insect farming can contribute to **revitalising rural areas** by **connecting agri-food supply chains**;
- Insect production activities also offer 'reliable' opportunities to **both crop and livestock farmers** to **diversify** their **production activities** and secure additional sources of income.

The COVID-19 pandemic highlighted the fragile nature of our agri-food supply chains. In front of new anticipated challenges, such as climate change – it remains essential to further understand how innovative solutions can bring value. In that context, **accelerating the development of innovative and sustainable production models** - which would complement existing food production systems - is **crucial** in order to improve overall resilience and reduce the pressure on our limited natural resources by the mid-2020.



*The European insect sector, although a young industry, intends to contribute proactively towards the transformation of our food supply chains into more **resilient** and **sustainable** food production systems, in line with the objectives of the 'Farm to Fork' Strategy (F2F).*

Antoine Hubert, **IPIFF President**

The European insect production sector intends to remain a **'committed partner'** with the view to achieving the **targets** outlined in the **'Farm to Fork'** strategy (F2F) - a key component of the European Commission (EC) overarching strategy towards achieving carbon neutrality in Europe by 2050⁹. The present document includes a **series of concrete proposals from the European insect sector** with the view to implementing the actions (i.e. legislative and non-legislative actions) suggested in the accompanying **EC action plan** (actions relevant for the insect sector). Notably, the insect sector could maximise its contribution as a **strategic partner** in the transition towards **climate neutrality**. Relying on circular processes inspired from nature, insect farming is among the most resource-efficient production systems - converting agri-food by-products and former foodstuffs into higher-value products.

- As announced on the 20th of May, the EC aims to 'foster EU-grown [...] feed materials such as insects'. In our view, the revision of the Animal By-Products and Transmissible Spongiform Encephalopathies pieces of legislation is a concrete example of how this objective should be translated into concrete regulatory action.
- The EU Legislator and the European Food Safety Authority (EFSA) have already initiated discussions which are of strategic importance for the development of the European insect sector (e.g. ongoing assessment of novel food applications covering insect food products, authorisation of insect proteins in poultry and pig feed). We trust that the **F2F flagship strategy** will serve as an **'accelerator' in the implementation of these major EU developments** for our sector, since these would allow the insect sector to maximise its contribution to the Green Deal objectives¹⁰.

The F2F and the deriving 'key EU policy reforms' arising from this strategy constitute, in our view, key milestones towards more circular and sustainable food supply chains.

⁹ In accordance with the 'European Green Deal' - the European 'Farm to Fork' Strategy published on 20 May 2020 outlines key milestones towards these objectives.

¹⁰ In the F2F, the European Commission aims to revise the feed ban rules for non-ruminant feed.

An overview of the IPIFF priorities

In this paper, IPIFF outlines the priorities of the sector towards 2025. While most of these objectives are connected to **the EU policy and/or regulatory agenda** (see chapter 1, 2, 3 and 4)¹¹, the development of the insect sector is also being directly impacted by **EU Member States national policies** (e.g. in the context of the implementation of the Common Agricultural Policy national and national Protein Plans – see chapter 5). Furthermore, in line with the EU Green Deal ambitions, we wish to highlight the crucial role of the European insect sector in addressing global challenges - see **'regulatory gaps' at global level** (see chapter 6).

In order to achieve the above targets, the whole sector must take its share of responsibility: insect producers proactively contribute to the advancement of standards, notably through **commitments towards highest production standards** (e.g. in the area of food safety or animal welfare). Collaboration between commercial actors (i.e. insect producers) and the **academic sphere** (public and private research including other commercial actors along the food and/or feed chain) should be consolidated in order to advance the necessary research towards the realisation of the policy and/or regulatory priorities of the sector^v.

These reforms are also necessary in order to unleash the potential of the insect sector. To advance their contribution to the F2F objectives, insect producers need a solid and fit-for-purpose EU regulatory framework to plan their investment and marketing activities ('Regulatory visibility'). The establishment of a level-playing field for insect farming remains of utmost importance, providing the 'necessary frame' for operators to implement the highest EU food and feed safety standards. IPIFF and its members are fully committed to take a proactive role in the collaboration with the EU institutions and national authorities. More specifically, we believe that a collective effort is needed in order to unlock certain opportunities

provided by the EU legislative framework – such as by establishing 'tailored' EU regulatory standards for insect production activities.

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Christophe Derrien,
IPIFF Secretary General

¹¹ According to a recent internal survey developed by IPIFF (September 2019), the national or EU regulatory context is the main factor affecting the growth of the European insect sector – more information in the 'IPIFF Vision Paper', available in the references.

I. Establishment of an EU regulatory framework for insect food and feed products

Insect producers - operators active at the stage of rearing, processing or final distribution of insects - are responsible for ensuring the safety of the products commercialised on the EU market. Like any other food or feed manufacturers established in the European Union, they must **adhere to the same EU food/feed safety standards** (e.g. obligations of traceability, implementation of auto control measures and risk management procedures) **which apply** to other food/feed sectors or industries.

- **The EU legislation imposes 'general' obligations and/or restrictions** applying to insect producers (e.g. registration or approval of their activities before national competent authorities, compliance with hygiene standards at the different stages of production, insects can only be fed with materials authorised for farmed animals, such as plant origin material and/or eggs and/or milk and derived products), insect producers have the obligation to keep their animals in good health so as to prevent the spreading of diseases among their production flock;
- Furthermore, EU rules provide a number of **'specific' obligations** in the case of the breeding of **invertebrate animals** (e.g. insects shall not be pathogenic nor have other adverse effects on plant, animal or human health¹² nor they shall be protected or defined as an invasive alien species¹³). Finally, breeders of invertebrates are exempted from animal welfare obligations which otherwise apply to **vertebrate animals**¹⁴.

Yet, the EU regulatory framework established in the early 2000 (e.g. 'General EU Food Law', 'Food'

and 'Feed Hygiene' Package Regulations) have been primarily devised to regulate the conditions of production and marketing of 'most commonly' farmed animals in Europe¹⁵. At that time, **the EU Legislator did not envision the particular case of insect production**. Consequently:

- Many of these 'general' **EU provisions are not tailored to insect production realities**, which in many respects differ from 'mainstream' farming and/or food/feed processing models.
- **Some uncertainties** have long-remained unaddressed at European level, such as the **'legal status' of insect products**, primarily as a **foodstuff**¹⁶ or on its different possible **uses in animal feed**¹⁷.

On 8 October 2015, the European Food Safety Authority published a **risk profile opinion evaluating the 'safety of insects as food and feed'**¹⁸. This opinion has paved the way for several major **EU policy reforms for the insect sector**.

- A few weeks following the above-mentioned EFSA opinion, the EU Legislator adopted **Regulation (EU) 2015/2283** which officially recognised 'whole insects and their preparations' as 'novel food' (recital 8 of the text)¹⁸;
- By the end of the year 2015, the EC initiated some preliminary discussions with the EU Member States authorities with the aim to allow the use of insect processed animal proteins (later referred as 'insect PAPs' or 'insect proteins') in feed for aquaculture animals. One year later - i.e. on 13 December 2016 - the EU Member States gave their 'green light' to the EC proposal on that matter¹⁸. The authorisation became effective as from the 1st of July 2017.

12 Catalogue of feed materials – Regulation (EU) 68/2013; see entry 9.4.1 'terrestrial invertebrates' and entry 9.16.1 'processed animal proteins'
13 Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species.

14 Article 1 d. of Directive 98/58/EC concerning the protection of animals kept for farming purposes

15 Such as domestic ungulate animals, fisheries, wild game or most commonly eaten molluscs - see Annex III of Regulation (EC) 853/2004 on the hygiene of foodstuffs.

16 Uncertainties as to whether insect-based products shall be considered as 'novel food' before 2018 – under Regulation (EC) 258/97 - and thereby subject to premarket authorisation, based on a safety assessment conducted by EFSA.

17 Earlier in 2013, it was still unclear for several insect producers whether insect proteins benefited from the lifting of EU feed ban rules on the use of pig and poultry PAPs for aqua feed.

18 The text clarified the fact that insects as food shall be subject to pre-market authorisation. Applications/dossiers shall be assessed by EFSA in view of being officially authorised on the European market.

19 See Commission Regulation (EU) 2017/893



The above regulatory developments marked a **breakthrough in the development of the European insect sector**, by providing insect operators with **'regulatory visibility'** needed to plan their investment and marketing activities. On the other hand, the **EU legislator** (via this reform) **recognised, for the first time, the economic potential for using insects in food and feed applications.**

Adriana Casillas, IPIFF Vice-President

Furthermore, the authorisation of insect proteins in aqua feed marked a major 'legislative opening' for the European insect sector. [Regulation \(EU\) 2017/893](#) which implemented the above authorisation can also be seen as a **'pioneering piece of legislation'** in the sense that the EU legislator created for the first time **EU standards** which are specifically applicable to insect production.

- Regulation (EU) 2017/893 introduces a [specific section for insects and insect products](#) in the EU Regulation on Transmissible Spongiform Encephalopathies (later referred as 'TSE Legislation' - Annex IV section F of [Regulation 999/2001](#)); this revision allowed insect-producers 'to make use of the same authorisation' as the one benefiting to those producing and processing proteins derived from other non-ruminant animals (i.e. pigs and poultry) for feeding aquaculture animals.
- To this end, insects must be processed in establishments that are **specifically approved for that purpose**. Notably, this procedure is required in order to assess that the potential microbiological risks associated with such products are appropriately managed by the producer. Furthermore, such approval is conditional on the **fulfilment of a specific processing method**, as described in the EU 'animal by-products legislation' - i.e. in [Regulation 142/2011](#) (annex IV, chapter III).

The authorisation is limited to seven insect species (see Chapter II of Annex X to Regulation 142/2011), namely to the followings: black soldier fly, house fly, yellow mealworm, lesser mealworm, house cricket, banded cricket and field cricket.

Whereas EU standards for insect feed production (insect proteins) are now in place²⁰, **insect food producers currently expect that harmonised EU norms will be adopted in the near future**. Filling the remaining legal gaps would bring the necessary regulatory visibility across the European Union.

1. EU standards applicable to insect food production: 'filling the regulatory gaps'

More than two years have elapsed since the 'new' EU novel food legislation (i.e. Regulation (EU) 2015/2283) has taken effect. During that period, above 20 applications covering insect food products have been submitted to the European Commission, in view of their authorisation on the EU market²¹. By May 2020 20th, 8 novel food dossiers were being assessed by the European Food Safety Authority (EFSA), from which the first positive scientific opinions could be expected by mid-2020. The **first novel food authorisations** by the European Commission could be expected **by the end of 2020 or during the 1st quarter of 2021**.

- Such authorisations will not only constitute a major milestone for the development of the insect food sector, but these will also pave **the way for the creation of specific EU standards for insect food products** (i.e. [Commission implementing Regulation \(EU\) 2017/2470](#) establishing the Union list of novel food will define conditions under which the product may be used, its labelling requirements, specifications, etc.)²¹.

European insect producers must already conform with 'general' food safety objectives and basic hygiene requirements - as provided by the 'General EU Food Law' ([Regulation \(EC\) 178/2002](#)) and [Regulation \(EC\) 852/2004](#) on the hygiene of foodstuffs²². Furthermore, [Regulation \(EC\) 2073/2005](#) imposes strict microbiological criteria for foodstuffs.

20 Standards subject to possible future amendments

21 For more information, please refer to the Briefing Paper on novel food (August 2019) - available in the references (chapter 4.6 p 21).

22 For example, insect food operators are expected to conform to traceability requirements, record keeping and HACCP based procedures.

Nevertheless, IPIFF pleads for the **establishment of EU requirements targeting specifically insect food production/processing activities**. According to European insect producers, these standards are needed in order to support these actors in the enforcement of the 'general' EU requirements and further harmonise the conditions of production between producers across Europe^{viii}. More specifically:

- 'We consider appropriate to set **specific microbiological limits for insect food products** consistently with parameters applying to the similar categories of products (e.g. crustaceans and molluscan shellfish)²³. These limits should be established in the framework of EU novel food authorisation covering insects - [Regulation \(EU\) 2017/2470](#) establishing the Union list of novel foods. More specifically, 'IPIFF recommends insect food producers to specifically monitor ***Bacillus cereus* and other *Bacillus spp.*** among other pathogens at the end of the manufacturing process and in incoming insect-based raw materials (e.g. insect flour to be incorporated as an ingredient in other food products such as pasta, bars, etc.)^{24 ix}.
- Once authorised, insect-based products would be subject to labelling requirements under [Regulation \(EU\) 1169/2011](#) (Food Information to Consumers - 'FIC' legislation). IPIFF identified mandatory **labelling specifications** (e.g. allergen labelling, among others) and provides recommendations for insect-based products under the framework of its [Guide on the provision of food information to consumers](#). Considering the allergenic potential²⁵ of insects as food, IPIFF strongly recommends **mandatory allergen labelling specifications** to be established in the Union list of novel foods in the framework of the authorisation of insect products²⁶.

2. 'Unlocking' new EU regulatory opportunities for using insect products in animal feed

Unlike EU food standards, the EU ABP and TSE legislation already incorporates provisions applying specifically to insect feed products. These requirements were introduced as part of the new EU provisions (Regulation (EU) 2017/893) implementing the 'aqua feed' authorisation (see above for further details).

Yet, we consider that **the regulatory framework remains 'incomplete'**. In our view, it will have to be developed in order to encompass these situations which remained governed by national legislation (see section b. below). On the other hand, EU food and feed pieces of legislation are 'evolutive' and are being regularly reviewed in order to reflect evolving sanitary conditions and/or emerging production and consumption trends. For several years from now, the EU institutions have initiated actions towards the gradual lifting of the EU feed ban legislation, which we believe, should primarily benefit to insect feed producers (see a. below)

A. Authorising insect proteins for pigs and poultry feed

Applicable since 1 July 2017, Regulation (EU) 2017/893 partially uplifted the 'feed ban rules' regarding the use of insect processed animal proteins (PAPs) for aquaculture animals (previously referred to as 'the aqua feed authorisation'). Yet, the 'feed ban rules' laid down in the TSE legislation still prohibit the use of insect proteins as feed for other livestock animals, such as monogastric species (i.e. pigs and poultry species^x). A few years ago, the **European Commission committed to prioritise its future reforms towards the further lifting of the above feed ban**, notably to authorise the use of insect proteins (as well as pigs and poultry proteins) in pigs and poultry feed.

IPIFF welcomes the **extension of** the above-mentioned **'legislative opening'** to the **feeding of non-ruminant livestock animals** (i.e. pigs and

23 References provided in the endnotes - 'IPIFF position on the revision of EU food hygiene legislation and import rules for insects as food' (5 November 2018).

24 'IPIFF Contribution on specific microbiological for edible insect products - *Bacillus cereus* and other *Bacillus spp.*' (30 April 2020) - IPIFF internal policy document. In addition, IPIFF has recorded a series of specific microbiological limits (e.g. *listeria monocytogenes*, *salmonella* or enterobacteria) in the framework of its Guide on Good Hygiene Practices (see references). The Guide portrays a table with pathogens and its parameters to be monitored for microbiological hazards - see page 71.

25 The existence of scientific evidence showing allergic cross-reactivity between insects and crustaceans. Source: Barre, A., et al., 2018. 'Food allergen families common to different arthropods (mites, insects, crustaceans), molluscs and nematodes: Cross-reactivity and potential cross-allergenicity.' *Revue Française d'Allergologie* 58.8 (2018): 581-593

26 Allergen labelling corresponding to allergens included in the Annex II of the FIC Regulation - i.e. Crustaceans and products thereof; Molluscs and products thereof.

poultry species). Over 90% of European insect feed producers see poultry feed as a promising opportunity'. On the other hand, **'technical' prerequisites** (e.g. availability of analytical methods, processing lines exclusively dedicated to the production of insect to exclude any risk of cross contamination) for this authorisation **are being met today**. Such a legislative change is backed by recent scientific evidence, developed under national regional or European research projects. In addition, calls from the European Parliament²⁸ or national ministries support the authorisation of insect proteins for poultry and swine animals with the view to improve EU's agricultural circularity and self-sufficiency with respect to protein-rich materials.

B. Defining EU Regulatory standards for whole insect as feeding ingredients

Legally recorded through the entry 9.16.2 (i.e. 'Terrestrial invertebrates, dead') of [Regulation \(EU\) 68/2013](#) establishing a Catalogue of feed materials, 'whole insects' used as feeding ingredient must undergo 'light' treatment (e.g. freeze-drying), but are not being processed to the extent of altering the physical characteristics of the product (e.g. not ground into meal or oil). **These products are commonly used for specialised pet shops**, notably to feed 'exotic' animals (e.g. reptiles) or domestic birds. Yet, these also present **numerous advantages when used as feed for livestock** (e.g. used as environmental enrichment in poultry husbandry, feed complement, beneficial effects for farmed animals' health or welfare) or **aquaculture animals**.

Yet, the **EU Legislator has strictly regulated** the possibilities for using these products as feed materials:

- [Article 18 of Regulation \(EC\) 1069/2009](#) (EU ABP legislation) allows EU members states, under certain conditions – i.e. provided that the absence of health risks is guaranteed - to authorise their use for zoo and circus animals, reptile, birds of prey, wild animals and fur animals, as well as for fishing bait;
- The use of frozen or dried insects is also possible for pet food animals (e.g. dogs and cats) under the condition that national authorities have specifically allowed the use of such treatment for the processing of pet food²⁹.

- Yet, since the use of 'light' treatments such as freeze drying is not considered as a 'processing method' according to the EU standards defined in the ABP legislation (i.e. processing methods defined in annex IV, chapter III of [Regulation \(EU\) 142/2011](#)), the derived products are not eligible as feed for farmed animals.

The absence of EU harmonised rules to regulate the feeding of whole insects for **pet food** animals and intended for **'specialised' markets** (e.g. birds, fur animals or fishing bait) creates an unlevel playing field for European insect producers, such practices being *de facto* authorised in a few EU countries 'only'.

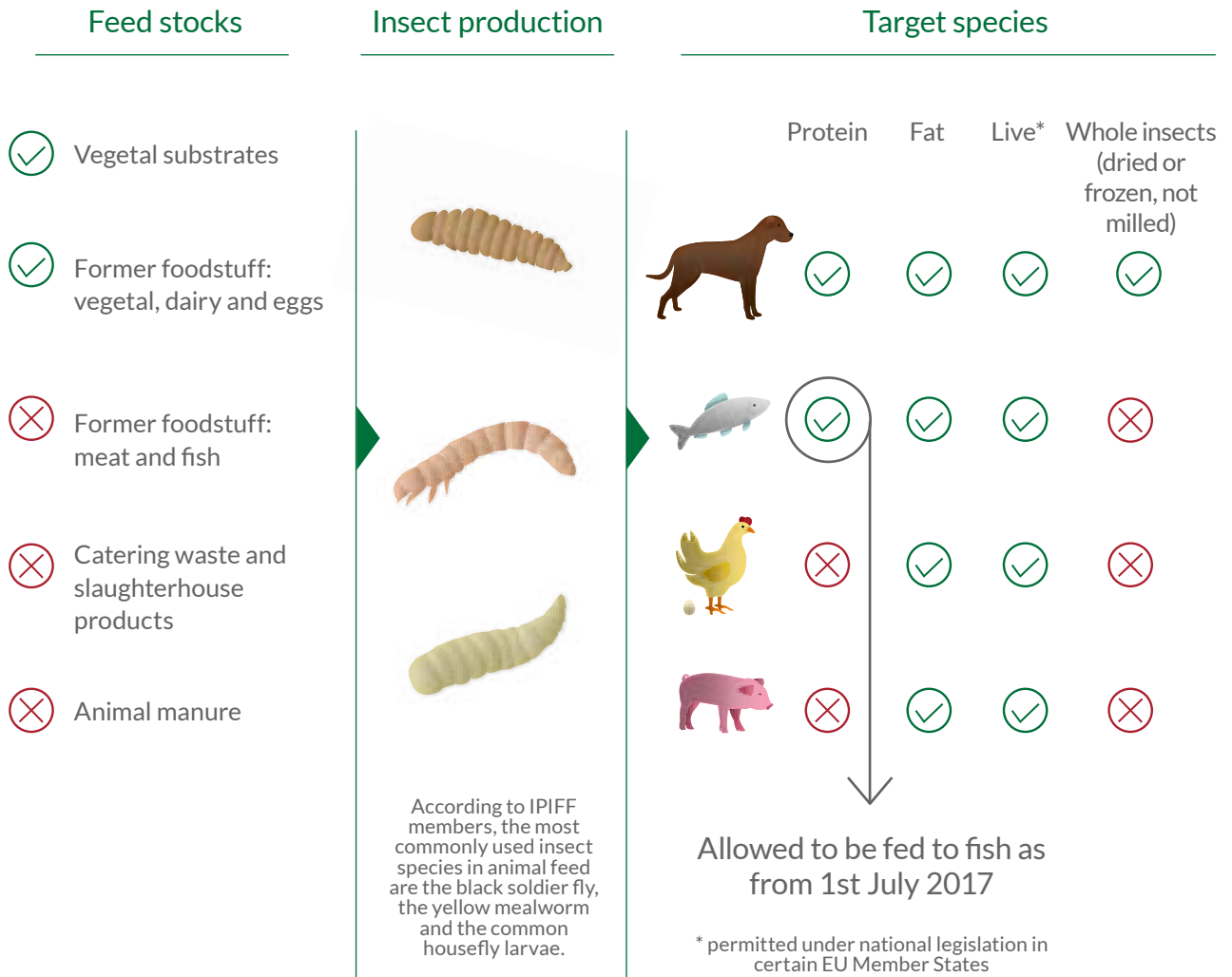
Furthermore, the **prohibition of using whole invertebrates for farmed animals** (e.g. poultry or aquaculture) **is not justified**, considering that insect producers must adhere to strict conditions of production, in accordance with the EU feed legislation (e.g. strict hygiene standards at rearing stage under Regulation (EC) 183/2005, compliance with limits provided in Directive 2002/32/EC on undesirable substances regarding the insect feeding substrates). In this context, **IPIFF pleads for the establishment of EU tailored rules in the framework of the ABP legislation** (e.g. definition of specific processing method under annex IV of Regulation (EC) 142/2011). We indeed consider that a solid EU legal basis is necessary in order to regulate these possibilities. This will contribute to guarantee that robust safety standards will be commonly applied by operators, thereby ensuring a level playing field for all European insect producers. Furthermore, the same rules and conditions should apply to insects imported into the European Union.

²⁷ On national level, projects developed by research institutes (ITAVI, INRA, Wageningen Research, etc.) provide conclusive evidence on the safety of the use of insect PAPs in poultry or swine feed, while on EU level, projects developed under the FP7 framework (e.g. PROteINSECT) further back these conclusions.

²⁸ 'Role of insect breeding as part of the Green Deal' – Parliamentary questions, [European Parliament – 2020](#).

²⁹ For more details, see Point 3(iv) of Chapter II of Annex XIII to Regulation (EU) 142/2011

IPIFF EU Policy Roadmap on the use of insects in animal feed (May 2020)



- **Objective n° 1:** Authorise insect proteins for aqua feed. **Target achieved (1 July 2017)**
- **Objective n° 2:** Authorise insect proteins for use in pig and poultry feed. **EU Member States' vote possible by the end of 2020.**
- **Objective n° 3:** Facilitate the wider use of 'former foodstuffs' by authorising products containing meat and fish³⁰ and other undervalued former foodstuffs (e.g. containing unavoidable packaging remnants). **EU legislative proposal targeted by 1 st half of 2022**
- **Parallel objectives:** EU authorisation of whole insects for farmed animals (including non-ruminant livestock and aquaculture)

30 From non-ruminant sources

II. Maximising the circularity potential of the insect sector through tailor-made pieces of legislation

The previous chapter emphasised the need to provide insect food and feed operators with further ‘regulatory visibility’ through the development of specific EU standards and/or by filling the ‘remaining EU legal gaps’. From a broader standpoint, we note that the **full potential of the insect sector** is also being **hampered** due to the **‘restrictive’ categorisation of insect products** as food or feed retained by the EU legislator (i.e. see ‘regulatory status’ of insects in the framework of the EU ABP and TSE legislation).

Notably, the **classification of invertebrates as ‘farmed animals’** in the framework of the EU animal by-products legislation³¹ illustrates the ‘catch-all’ strategy chosen by the EU Legislator when enacting EU food and feed legislations. Indeed, these texts do not apprehend the ‘fundamental differences’ which exist between insect production (and/or the production of other invertebrates) and other more ‘traditional forms’ of rearing (e.g. production of domestic ungulates).

In practice, this classification leads to **asignificantly lower spectrum of materials being authorised for the feeding** of farmed insects produced in the EU (later referred as ‘feeding substrates’ - see section 2 below), while **hindering the potential for valorising their derived products** (e.g. insect production output and by-products), either as feed or for technical uses (see section 3 below). IPIFF considers necessary to overcome these regulatory bottlenecks. As these efforts may command to overhaul certain EU regulatory provisions (e.g. establishment of a ‘new classification’ or of a ‘new status’ for farmed insects in the framework of the EU ABP or TSE legislation), **we acknowledge the need to build solid scientific evidence and continue in-depth research activities** with the view to support such policy reforms. IPIFF and its members are

eager to collaborate proactively with the European institutions (e.g. European Commission) and the European Food Safety Authority (EFSA) to this end.

1. Broadening the spectrum of EU authorised insect feeding substrates

A. Background

Insect production activities can bring diverse opportunities for crops farmers and local agri-food actors, by upcycling by-products from the agri-food industries, while offering highly nutritious and sustainable solutions for European consumers and livestock farmers. By selecting substrates from local partners in a small geographical area, European insect producers also contribute to facilitating the transition from linear to circular business models in agriculture, while revitalising these food-producing areas³¹. Finally, insect farming contributes to tackling the challenge of food waste³² by feeding insects with co-products and resources which are being discarded and are no longer destined for human consumption or animal feed.

The so-called **‘former foodstuffs’** are a typical example of these ‘underused resources’. These encompass products which have been originally manufactured for human consumption. Yet, for commercial reasons or due to problems of manufacturing or certain defects, these are being discarded from the food production chain (e.g. by agri-food food processors or food artisans such as bakers) including at distribution level³³.

Former foodstuffs containing ingredients of **vegetal origin** and/or materials of animal origin which are specifically authorised by the EU Legislator³⁴ can theoretically be used for animal

31 See article 3 6. of Regulation (EC) No 1069/2009 on animal by-products.

32 Before such products are classified as ‘waste’

33 Such as unsold products from supermarkets or by local retailers - definition inserted in recital 3 of Regulation (EU) 68/2013 on the Catalogue of feed materials.

34 See list provided in annex X, section 10 of Regulation (EU) 142/2011 (eggs, milk and their derived products, rendered fat, gelatine)

feed, provided that they do not present any health risks for the targeted animals. Yet, in practice, the possibilities **for using former foods in animal feed are being largely hampered**. In the EU Guidelines for the feed use of food no longer intended for human consumption^{xii}, the European Commission notably emphasised the administrative challenges faced by the concerned operators (e.g. double registration to comply with feed hygiene and labelling legislation) and the lack of harmonised implementation of these possibilities across EU Member States, thereby limiting their use. Furthermore, the strict enforcement by EU Member States' competent authorities of the **prohibition of use of packaging residues in animal feed**³⁵ constitutes a major obstacle towards the valorisation of these materials as animal feed.

Insects may facilitate the upcycling of these products, including in cases where **unavoidable traces of packaging materials** may still be present (e.g. plastic, carton). According to recent scientific studies (e.g. Brandon et al., 2019)^{xiii}, these animals have shown the ability to degrade these materials and/or avoid their derived chemical impurities³⁶. Several IPIFF members have been conducting trials or collaborated with prominent academics and research institutes (such as through participation EU funded research projects) to advance research on these subjects³⁷. Yet, further in-depth investigations are necessary to provide compelling evidence that insects fed with former foodstuffs containing traces of packaging residues effectively eliminate residues from such unauthorised materials.

Former foodstuffs containing meat and fish are currently prohibited for use in animal feed at EU level. Concretely, while vegetarian pizza unsold at retailers' level could be used as feed for insects – a meat-containing variety cannot. Several research activities - to which the IPIFF members have been associated - have also been conducted in this field. Notably, these aimed at assessing hazards such as microbiological contaminations or animal disease associated with the use of these materials, while exploring options to manage those risks appropriately via heating treatments/

processing methods. As concluded by the Dutch 'Office for Risk Assessment and Research'^{xiv}, an 'adequate germicidal treatment of the larvae' could eliminate any risk associated with the use of meat or fish-containing substrates.

According to IPIFF, the above-mentioned options would offer significant opportunities for reusing resources/biomass which would have otherwise been discarded or underexploited. According to a recent survey realised by our organisation, 'facilitating the wider use of former foodstuffs in insect farming has the potential to generate up to **5 million tonnes** of insect protein by **2030**'¹. This approach is in accordance with the waste hierarchy principles, thereby contributing to maximising the circularity potential of the insect sector.

B. IPIFF legislative proposals

IPIFF supports **mandating of the European Food Safety Authority** to deliver fully documented conclusions on the **potential risks associated with the use 'former foodstuffs containing meat and fish'** as feed for insects³⁸. The IPIFF Secretariat and the IPIFF members are available to collaborate and support the work of EFSA to that effect^{xv}.

1. More precisely, we consider necessary to **facilitate the valorisation of EU authorised former foodstuffs** (use of vegetal based products or animal products as already authorised under the ABP legislation), notably by exploring the potential for insects to degrade or eliminate unavoidable residues from packaging materials, while ensuring that the risks of bioaccumulation of chemical contaminants derived from the adventitious presence of these residues are mitigated.
2. Furthermore, we intend to investigate the options for authorising **former foodstuffs containing meat** (from non-ruminant animals) **or fish** as feed for farmed insects. Such an authorisation could be envisaged, in case the absence of any safety risks nor adverse health effects for the targeted animals can be demonstrated.

35 Annex III to Regulation (EC) 767/2009 lists 'Packaging from the use of products from the agri-food industry, and parts thereof' as materials whose placing on the market or use for animal nutritional purposes is prohibited. Former foodstuffs with excessive chemical contamination (e.g. derived from unpacked materials) in animal feed is prohibited (Directive 2002/32/EC on undesirable substances).

36 A recent study published by Stanford University confirms that the presence of HBCD – a common flame retardant – in the substrate of insects does not lead to bioaccumulation.

37 According to a publication of the Danish Environmental Protection Agency, the response of black soldier flies to plastic was investigated by the Danish Technological Institute – source: WICE - Waste, Insects and Circular Economy, Fischer et al., 2018. Report on environmental project no. 2011 (in Danish). Danish Environmental Protection Agency, 51 pp

38 Products containing 'meat and fish' from non-ruminant sources.

- In the scenario where such evidence can be documented, IPIFF suggests to **amend the list of authorised ‘former foodstuffs’ of animal origin** for use in animal feed (i.e. amending annex X, chapter II, section 10 of Regulation (EU) 142/2011), by including meat (i.e. meat originating from non-ruminant) and fish origin ingredients in the above-mentioned list.

The use of these yet unauthorised materials would theoretically benefit to any other farmed animal species, including livestock animals. However, hazards associated with the feeding of farmed terrestrial animals (e.g. pigs and poultry species) with meat and/or fish ingredients incorporated in former foodstuffs may differ from those applying to invertebrates, considering the major physiological differences between these different animal orders. Furthermore, this scenario requires the implementation of very robust traceability and segregation measures by operators active in the processing of former foodstuffs as well as by feed manufacturers. Finally, ‘fully reliable’ analytical methods must be in place in order to enforce EU feed ban rules for ruminant animals as well as the prohibition of intraspecies recycling (cannibalism).

- Against this background, IPIFF recommends that EFSA’s assessment regarding the use of former foodstuffs containing meat and fish is primarily targeted at farmed insects³⁹. A positive opinion from the Parma-based agency could serve as basis to establish a ‘derogatory regime’ for farmed insects in the framework of the EU ABP legislation (e.g. derogation from standard rules applicable to ‘farmed animals’)⁴⁰.

According to the European Association for Former Foodstuffs Processors (EFFPA), whose members currently do not process any former foodstuffs containing meat or fish, the above scenario could offer opportunities to efficiently valorise a vast amount of materials which are currently lost from the food chain. Former foodstuffs processors are ready to partner up with insect producers to jointly explore the possibilities of setting up chains where former foodstuffs containing meat or fish are used, once the EU regulatory approach on ABP considers it to be safe. Notably, former foodstuffs processors have many years of professional

experience in the processing (e.g. mechanical food packaging removal) of lawful former foodstuffs as well as strongly developed logistical capacities that can quickly adapt to offer and demand.

2. Further valorising insect production outputs

Insect production generates a multitude of products and by-products which bring added value not only from the sustainability standpoint, but also thanks to their economic value. Whereas proteins, lipids/oil or dried whole insects constitute the ‘main output’, insect production also generates insect larvae faeces (later referred to as ‘insect frass’), which have the potential to be revalorised efficiently in a number of ways.

While upcycling possibilities of the above products or by-products remain relatively limited due to the absence of EU harmonised standards today, like in the case of ‘whole insects’ (as highlighted in chapter 1) or in the case of insect frass – (see below), IPIFF also deplores the negative impacts resulting from the ‘restrictive’ categorisation of insect products provided under the EU ABP legislation (see introduction). In our view, the establishment of **tailor-made requirements** for insect production activities - based on the specific characteristics of insect products and risk profile - **is necessary** in order to **unleash the possibilities to further valorise these products** and/or **by-products** (e.g. adapt conditions/criteria for valorising insect frass as organic fertiliser, expanding the list of authorised substrates in cases where insects proteins or oil are intended for technical uses) in line with the principles of Circular Economy.

A. Valorisation of insect frass as organic fertiliser

Mainly used in nurseries, viticulture, or by arable crops farmers and (professional or amateur) horticultors, **insect frass has great potential to be upcycled as a fertilising product** (e.g. organic fertiliser/soil improver with compost-like properties material). By reintroducing valuable nutrients into the food chain - generating essential complementary revenues for insect producers -

³⁹ Focus on authorised insects species for the production for processed animal proteins (annex X, chapter II, section 1 A 2. of Regulation (EC) 142/2011

⁴⁰ E.g. Article 11.1 (b) of Regulation (EU) 1069/2009 forbids the feeding of farmed animals with catering waste, except for fur animal.

the valorisation of insect frass as organic fertiliser is a sustainable solution for European farmers and/or gardeners^{XI}. However, the 'fragmented' EU regulatory framework currently restricts the possibilities for insect producers to upcycle such high-quality materials, impeding their commercialisation on the European market. In this context, IPIFF has devised a **'three steps policy plan'** towards the creation of an **EU regulatory framework allowing for wider use of these valuable nutrients**, in compliance with harmonised and robust safety standards^{XVI}.

1. Firstly, IPIFF urges the European institutions to clarify the 'regulatory status' of insect vis à vis other farmed animal excrements – i.e. 'animal manure' – in the framework of the EU ABP legislation⁴¹. IPIFF thus warmly welcomes the recent EU discussions initiated by DG SANTE⁴², aiming at **defining 'insect frass'** and **aligning its processing parameters to EU standards applicable to animal manure** (i.e. treatment at 70° C for at least one hour)⁴³. By defining harmonised and workable standards, the EU Legislator will safeguard the possibilities for valorising these products in all EU Member States, and thereby contribute to the creation of a level-playing field for insect frass application across the continent.
2. Alongside the above-mentioned action, we are willing to engage into more in-depth **reflection on the development of tailored and 'fully harmonised' standards** in order to regulate the upcycling of insect frass as organic fertiliser. These efforts should articulate around two main pillars:
 - the establishment of specific thermal treatment parameters (e.g. lower temperature levels) which are more tailored to the characteristics of insect frass and to the risk profile associated with these products;
 - the development of control measures to mitigate the potential risks (i.e. microbiological and chemical risks) associated with the spreading of untreated frass (e.g.

product analysis/sampling measures to verify adherence to maximum thresholds for chemical and microbiological contaminants, the establishment of a maximum threshold for the presence of dead larvae in the final product).

IPIFF is calling for the development of **ambitious research projects** (e.g. EU funded research projects) in order to document the above-mentioned 'regulatory plan'. These experiments could focus on the ways to process insect frass and address potential microbiological and biological risks associated, while safeguarding their nutritional properties⁴⁴. These should constitute a solid basis to support **EFSA's work** towards documenting/recommending specific thermal treatment and **mechanical processing** (in case of untreated frass) **methods** in the framework of the EU ABP legislation.

3. Finally, we plead for the establishment of a **specific 'product category'** and **tailored standards for insect frass** as part of the recently adopted EU Fertilising Products Regulation – (i.e. under CMC 10 which concerns 'animal by-products')⁴⁵. Conditioned to the definition of a so-called 'end point' within the EU ABP legislation (i.e. Regulation (EU) 142/2011), such a scenario would contribute to ease and further **harmonise authorisation** procedures which insect producers must currently undergo in order to licence their products on the national market. Finally, it would provide legal basis for the **free commercialisation** of these products across the European Union.

41 See article 3. 20. of Regulation (EU) 1069/2009.

42 Proposal still under discussion presently – spring 2020.

43 See annex XI, section 2 to Regulation (EU) 142/2011.

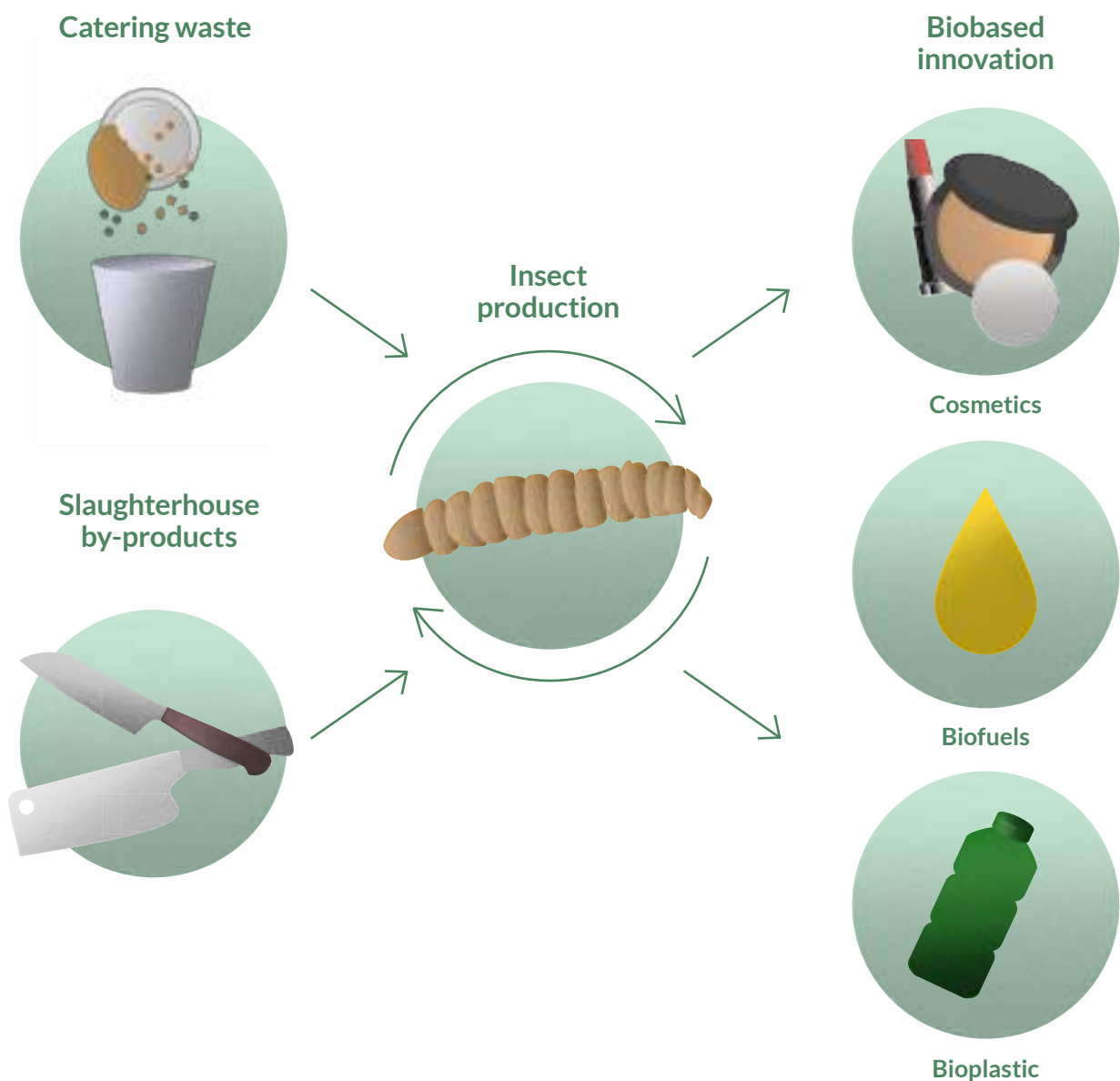
44 The treatments methods used should not lead to killing important bacteria for plant health and development. IPIFF supports the development of research projects that further aim at investigating the chemical and microbiological properties of frass and its compatibility with plant-specific biological requirements. Subsequently, these projects shall build on the recent evidence (Poveda et al., 2019) and investigate the immense potential of insect frass in improving plant-health and development, with the view to reduce the use of synthetic inputs.

45 Regulation (EU) 2019/1009 on the marketing of EU fertilising products

B. Maximising the potential of insect-based products for technical uses

Insects products and by-products do not constitute a valuable material for direct valorisation 'within the food chain' only (e.g. directly as food or as feed for food-producing animals). These may also be used as feed for non-food-producing animals (e.g. pet food animals) or for technical purposes (e.g. cosmetic industry, bio-based fuels, production of other bio-based materials such as bioplastics). 'Recent studies confirm the added value of insects

in converting low-value materials into a wide range of outputs such as biogas and biodiesel'⁴⁶. Insects indeed have the ability to improve the efficiency of such chains, notably by reducing the mass of the inputs used in technical applications, while concentrating the necessary elements needed in such applications.



⁴⁶ Taking advantage of the fat content of insect larvae, biodiesel of similar qualities to rapeseed oil-derived fuel can be produced. See the 'Biodiesel production from various feedstocks and their effects on the fuel properties' (Canakci et al., 2008) and the IPIFF document 'Research priorities of the European insect sector' for further reference.

While the potential for the development of these outlets is significant, presently, they remain relatively marginal in European insect producers' marketing plans. The exploration of these markets requires significant R&D efforts. Moreover, **their added-value** from a Circular Economy and sustainability **perspective presently remains uncertain**, considering the 'restrictive' EU legislation on permitted insects' feeding substrates⁴⁷. A contrario, insect productions systems relying **on currently unauthorised substrates and/or 'less competed'** inputs would reinforce the value and/or interest in investing into these **new outlets**. These inputs, which are not necessarily suitable for insects farmed for food or feed, could subsequently be upcycled into sources of energy or other alternatives to linear systems of production, thereby contributing towards the efficient revalorisation of these materials - while improving the competitive advantage of European insect producers^V.

Against this background, IPIFF wishes to explore the possibilities for authorising **catering waste as insect feeding substrate** (incl. canteen and household waste) in the particular case where the derived production **output is intended for technical use**. To this end, IPIFF suggests establishing a **'derogatory regime' for farmed insects in the framework of the EU ABP legislation** (e.g. derogation from standard rules applicable to 'farmed animals' ⁴⁸). Recent studies evaluating the effects on feeding farmed insects with catering waste have indeed shown the absence of impact on animal health and safety of the products.

Empirical experience on the use of these new materials would help to explore authorising a wider spectrum of inputs (e.g. slaughterhouse products, organic materials) in the future. Meanwhile, we recommend to restrict the proposed possibility to insect producers whose **production activities are exclusively focusing on non-food or non-feed outlets** and for which effective **separation/segregation** between different production lines (i.e. food/feed vs. technical applications) can be guaranteed.

47 See introduction - classification of invertebrates as 'farmed animals' (Regulation (EC) 1069/2009 - article 3 6.).

48 More information in the IPIFF position paper on the use of insect proteins as animal feed - available in the 'references'.

III. Edible insects – sustainable and healthy solutions for a balanced European diet

Hunger and food waste remain a global paradox. While generally, discussions around food security are primarily focusing on developing countries, circa '43 million people in the EU cannot afford a quality meal every second day'. Concurrently, the annual per capita food waste generated in the European Union exceeds 170 kilograms^{xvii}. Moreover, Eurostat statistics indicate that every second European is overweight.

These above-mentioned elements reflect the urgency to implement a comprehensive strategy that aims at promoting sustainable food consumption. In our view, such a roadmap shall be based on both regional and European support mechanisms, that facilitate the shift towards healthy, sustainable diets, while also improving the communication of food information to consumers. To this end, we identify two areas of actions which could be further explored:

- **Better educate consumers with respect to sustainable food choices.** In our view, raising awareness regarding a healthier and more environmentally friendly diet represents a life-long process. We consider that school education is the key starting point, providing example-oriented guidance applicable to individuals and families alike. Edible insects are high in protein, packed with essential vitamins, minerals and other nutrients. They are also high in monounsaturated fatty acids and/or polyunsaturated fatty acids (MUFA, PUFA) - certain of which cannot be produced by the human body. Prebiotic fibres found in edible insects, such as chitin, also assist in ensuring a healthy human gut⁴⁹. Edible insects and their derived products should be included in the 'favourable food environment' created to make healthy and sustainable diets an easy, accessible, and encouraged choice for EU citizens. In addition to food information

through labels or daily reference intake, such information campaigns should highlight the importance of food waste reduction, too.

Anticipating the first novel food authorisations, IPIFF developed an up-to-date labelling guidance document with the view to support food business operators in prior to placing on the market their insect-based food products.

- **Improve synergies between national dietary guidelines, while engaging in a future-oriented dialogue on developing EU-wide directions on this matter.** The worrying trends with respect to obesity and unhealthy dietary habits reflect the urgency to maximise efforts in a European context. In our view, we believe that an EU-wide dietary guideline shall consider local/regional opportunities to diversify current diets. Moreover, such a roadmap could equally reflect the anticipated changing dietary patterns - also in the context of the transition towards climate neutrality by 2050. Novel sources of nutrition should be evaluated considering their added value with respect to targeted nutrition (maternal or child nutrition, sports diets or healthy ageing) – as an individual ingredient (e.g. fortifier) or in combination with other traditionally used ingredients. The added value of edible insects in tackling nutrient deficiencies (such as iron or vitamin B12 deficiency) or providing high-quality amino acids to low protein diets should be explicitly included in such dietary guidelines⁵⁰.

49 Further information is included in the IPIFF factsheet on 'Edible insects and human nutrition' (available in the references).

50 See the above-mentioned factsheet on the advantages of edible insects for human nutrition.

IPIFF developed a factsheet on 'Edible insects and human nutrition', presenting the key benefits of insects when included in our diets. Highlighting the numerous opportunities to incorporate insect-derived products in commonly consumed food – such as bakery, pasta or bars – this document equally promotes the importance of a balanced diet. An overview of the expected market developments will be illustrated in a market factsheet published in June 2020.

IV. Responding to the growing demand for EU organic products

Partnerships between insect producers and organic farmers are flourishing in Europe and we forecast that these will further develop in the future. **Insect producers implement sustainable practices** both at breeding (e.g. non-use of veterinary drugs or genome editing techniques) and processing stage (e.g. non-use of harmful synthetic chemicals), in line with the objectives and principles of the EU organic legislation^{XVII}. While insect-based products can be certified organically in certain EU third countries (e.g. USA, Canada or Switzerland), EU insect producers are not eligible to (public) organic certification, due to the **absence of EU organic standards** for their products. To bring a positive contribution to the creation of such standards, IPIFF closely collaborates with the European Commission on this matter⁵¹. In this section of the document, we aim at clarifying the opportunities for insect business operators under the new EU organic regulation.

The recently published 'Farm to Fork' strategy underlines the need to promote the development of organic production models in Europe. Moreover, the new EU organic legislation^{XVIII} brings diverse opportunities for both insect food and feed business operators. This new piece of legislation (i.e. Regulation (EU) 2018/848) encourages shorter distribution channels and local production. More specifically, this document increases the share of regional feed materials by 10% - with 30% for swine and poultry species^{XIX}.

However, at this point in time, addressing the anticipated growing demand for organically certified products in the EU remains challenging with the current production patterns. **Firstly**, while the increase in the share of regional feed products could reduce the overall footprint of such farming systems - with economic benefits for the local economy, too - this element might represent a real bottleneck for farms already certified, 'in conversion', or farmers wishing to certify their animal-based products. **Secondly**, considering

that such local organic feed ingredients are already scarce in some EU regions, the fact that the global demand for certified feedstuffs will continue to exceed the supply will lead to unexpected consequences on the price of feed and end-product alike^{XX}. In line with the natural diets of aquaculture, poultry or swine species, insects could prove to be a sustainable solution to the increasing demand for organically certified materials. The addition of locally produced insect-based feed to the diet of farmed fish, chickens or pigs can help organic farmers in achieving the target for regional feed products - diversifying the spectrum of possibilities available. Subsequently, such innovative products - being among the most efficient high-protein ingredients in terms of land-use footprint - will contribute to reducing the land footprint of organic farming.

'Our sector hopes that the development of organic standards for insect farming will allow the sector to maximise its contribution towards a more sustainable food-producing system, providing local solutions to local challenges'^{XXI}. The synergies behind modern insect farming and the principles of organic farming represent, in our view, a considerable opportunity in the development of both sectors^{XXII}. To this end, and in the perspective of implementing the new EU organic legislation, IPIFF has devised a **three steps policy plan**:

- Exploring the possibilities for including insect products in feed for organic aquaculture animals;
- Supporting the inclusion of insect proteins (derived from non-organically produced animals) in organic poultry and swine feed (up to 5 %);
- Developing EU regulatory standards for the organic certification of insect production activities.

⁵¹ For example, by developing contribution documents on specific topics - 'IPIFF Contribution Paper on EU organic certification of insect production activities' (29 March 2019).

1. Exploring the possibilities for including insect products in feed for organic aquaculture animals

While aquaculture is presently the fastest growing food-producing sector globally, EU's fish and seafood self-sufficiency remains well under 50%. Conversely, aquaculture is seen by the EU policymakers as a key sector in reducing the footprint of food production, while also ensuring that sufficient high-quality animal protein products are accessible to EU consumers^{xxiii}. Organic aquaculture is expected to grow fast in the coming years, preponderantly in countries where organic products are well-established on the market (France, Germany, Spain or the UK)^{xxiv}. However, certain bottlenecks - such as the availability of sufficient certified organic feed - could be a major challenge in this process^{xxv}.

A viable opportunity is the use of insect-derived ingredients in the diet of carnivorous aquaculture species (e.g. salmonids - such as salmon or trout - which represent the main 'aquaculture' species in terms of value). Such species - which developed their aerial feeding behaviour to feed on non-aquatic insect species - require a diet rich in protein. While plant-based materials were used to substitute fishmeal, such vegetable feedstuffs might not provide a complete diet for carnivorous species. Building on the success story of insect-derived ingredients in conventional aquaculture, the addition of insect-derived protein to organic compound feed formulations will play a positive role in providing a nutritious and sustainable diet to such fish species.

Moreover, considering that presently the EU organic legislation allows the use of inputs that cannot be per se certified organically (such as marine-derived ingredients from sustainable sources), we strongly believe that insects could complement the growing demand for organic aquafeed products - in line with the natural diet of such fish species⁵². IPIFF and its members see aquaculture of crucial importance in the transition towards climate neutrality. Therefore, we strongly believe that the sustainable advancement of EU organic aquaculture can be directly facilitated by the availability of premium quality feedstuffs - such as insect-derived ingredients - produced in accordance with the principles of organic farming⁵³.

2. Supporting the inclusion of insect proteins in organic poultry and swine feed

Organic pig meat, broiler chicken and laying hens farming represent a niche in contrast to the conventional output of these sectors^{xxvi}. However, it is worth noting that organic poultry farming is the fastest-growing certified livestock, with an average annual growth rate of 10%. Further supporting the development of this sector - in line with the increasing consumer awareness and demand - directly depends on the availability of local, sustainable and nutritious feedstuffs. Complementary, ensuring that sufficient organic feed materials are available for certified pig farms would also allow this sector to expand.

While presently, the authorisation of insects in organic poultry and swine feed is directly influenced by the EU 'horizontal legislation' (see chapter I, subsection 2a)⁵⁴, IPIFF proposes the use of up to 5% of insects in organic poultry or swine feed, in line with the measure envisaged for juvenile animals⁵⁵.

3. Developing EU regulatory standards for the organic certification of insect production activities⁵⁶

In parallel to the above regulatory scenarios, IPIFF actively supports the creation of a fit-for-purpose EU regulatory regime for the organic certification of insect production. While a large part of the European insect farms are *de facto* following organic principles, elements related to maximum population density levels for example - that are not in agreement with the biological lifecycle of such invertebrates - require the elaboration of reasonable, specific, organic standards for insect farming. Such norms would be primarily beneficial for insect farms, who could better valorise their premium products, but also for livestock farms - which would have a more diverse palette of locally-available, nutritious options for their organic fish, chickens or pigs. Subsequently, organic standards for insect farming would bring advantages for crop farmers alike - who could directly apply the insect dejecta (i.e. insect frass) on their agricultural land, improving soil fertility and its ability to store carbon.

52 IPIFF proposed the authorisation of insect-derived ingredients for organic carnivorous aquaculture species as part of a public consultation launched by the European Commission in July/August 2019.

53 In a recent letter sent to the Directorate-General for Agriculture and Rural Development, IPIFF called on the 'European Commission to prioritise the authorisation of insects in organic aquaculture feed'.

54 More precisely, before allowing insects in organic poultry or swine feed, the use of insect PAPs should be authorised in conventional poultry and swine feed.

55 In line with the articles 1.9.3.1. and 1.9.4.2. on poultry and porcine nutrition - Regulation (EU) 2018/848.

56 In its Contribution Paper on the organic legislation launched in March 2019 (see references), IPIFF presented a list of recommendations with respect to the peculiar elements of insect farming - factors which should be considered in the creation of organic certification standards for insect farming activities.

V. Recognition of ‘new food and feed sources’ under ‘EU strategic frameworks’



As described in the first three chapters, adaptations to the current EU regulatory frameworks (EU food and feed law, EU organic legislation) are instrumental for the development of the European insect sector. Yet other policy frameworks (i.e. EU Protein report, Common Agricultural Policy, Horizon Programme, Circular Economy Action Plan) may positively contribute to the expansion of the sector - and more generally to improve the availability of new sources of proteins.

In our view, the above-mentioned frameworks/strategies, are essential to facilitate the dissemination of best practices in agriculture throughout the continent. While on the one hand, such mechanisms proved to play an important role in supporting less developed EU regions, the lessons learnt could prove to be beneficial beyond Europe, too. Therefore, maximising the contribution of the insect sector to the EU ‘Green Deal’ objectives will bring indirect benefits in other parts of the globe, where such solutions could be implemented in order to address agri-food challenges.

1. IPIFF recommendations

IPIFF considers that the above-mentioned initiatives should integrate specific measures aiming at stimulating ‘new food and/or feed sources’ (e.g. algae, microbial proteins, fermentation products and insects) as part of the proposed EU policy or financial instruments towards achieving sustainable and resilient food supply chains. In that context, we consider that combinations between vegetal and animal-based products as well as between ‘new’ and ‘conventional’ sources should be fully explored.

- IPIFF supports the development of call for projects targeted at developing new innovative food and feed ingredients under the **new Horizon Europe Research framework programme**. IPIFF recently expressed its support for future-oriented research projects^v, which would bring added value in

addressing challenges related to food waste, soil fertility, as well as human and animal health.

- In the CAP post-2020, **agri-environmental measures** should be established in the framework of national rural development programmes to support farmers who decide to **diversify their activities by developing insect production systems**. Concurrently, such national incentives - supporting **local initiatives** that aim at transitioning towards ‘**circular/integrated**’ **local supply chains approaches** (reuse of locally/regionally produced co-products from farmers and agri-food actors to feed insects and use of insect products as feed by livestock farmers) shall further be stimulated. These measures would indeed contribute to bolstering the competitiveness of these actors while contributing to the revitalisation of rural economies. In our view, modern farming practices – such as insect farming – will play a serious role in making agriculture more attractive, reducing rural exodus and facilitating generational renewal in agriculture.
- Building on the objectives of the ‘New Circular Economy Action Plan’^{xxvii} the actions on reducing food waste should target **losses at all stages of the supply chain**. In particular, IPIFF supports partnerships between different actors across the production value chain, with the view to optimise the use of resources and to improve local resilience.

Synergies between the above initiatives will play a key role in facilitating the transition towards climate neutrality, while also improving the sustainability of food systems. Notably, we anticipate that, by the end of the decade, a favourable regulatory context for insect farming would improve EU’s protein feed self-sufficiency by 6%⁵⁷, while providing healthy, nutritious food products for the general consumer and specialised diets alike.

⁵⁷ Reaching 83% - estimations based on the IPIFF annual questionnaire (mentioned in the IPIFF Vision Paper) and the EU protein report.

VI. Commitments of the insect sector towards the establishment of baseline standards at an international level

Over 2000 insect species are edible, with a high share being part of traditional diets for about two billion people globally. Furthermore, the introduction of insects as a novel type of food and feed in countries without a significant history of consumption (e.g. the European Union, the United States, Canada, etc) has received certain attention, generating a prompt regulatory response. However, the insect as food and feed regulatory framework remains scattered – with incomplete or absent regulatory background. Thus, with increasing demand (and proportional production volumes), industrialised production methods and complex food chains require minimal baseline standards globally (under the Codex Alimentarius) to provide business operators with a level playing field to trade, whilst ensuring safe and regulated products on the market.

1. IPIFF activities and recommendations

IPIFF prioritises consumer safety and the responsible growth of the sector both on European level and globally. To this end, IPIFF collaborates with regional insect as food and feed associations (active in North America – NACIA, Southeast Asia – AFFIA, Australia - IPPA) and international governmental organisations (notably the Food and Agricultural Organisation of the United Nations - FAO) to facilitate knowledge sharing and the development of international guidelines for insect farming and insect-based products alike. Against this background:

- IPIFF coordinates and contributes to the development of a **'White paper on the global future of insects as food and feed'** to identify

global sector-specific challenges and propose solutions to tackle them;

- **IPIFF recommends and promotes the use of national, sector-specific guidelines** on various aspects of the insect food and feed value chains. It aims to assist stakeholders in risk mitigation by implementing good hygiene, manufacturing and labelling practices required under the national legislation;
 - **IPIFF supports the development of standards for insects under the Codex Alimentarius.** The Codex Alimentarius would serve as a fundament for baseline standards for insect products. The development of harmonised norms for insect food and feed products by the Codex Alimentarius Commission would bring additional support in the development of national standards in countries where this sector-specific regulatory framework is minimal or even absent. Moreover, these standards would make comparisons between products more realistic, facilitating the trade of insects as food and feed⁵⁸. Furthermore, the rapid development of the insect sector-specific regulatory framework in the European Union (EU) could serve as an initiating point for global food and feed standards. Thus, IPIFF urges the European Union along with the Member Nations part of the 'Codex Alimentarius Commission' to initiate and facilitate the development of such standards for insects as food and feed under the Codex Alimentarius.
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⁵⁸ Such as criteria for insect production activities, hygiene practices and labelling guidelines.

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The International Platform of Insects for Food and Feed (IPIFF) is a nonprofit organisation which represents the interests of the insect production sector towards EU policymakers, European stakeholders and citizens. Composed of 64 members, most of which are European insect producing companies, IPIFF promotes the use of insects and insect-derived products as top tier source of nutrients for human consumption and animal feed.

