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Welcome

On behalf of EAAP – the European Federation of Animal Science – it is my pleasure to welcome you to the 71st EAAP Annual Meeting, the first to be held as in virtual form.

EAAP was founded in 1949 and entering in its eighth decade EAAP remains the organiser of one of the world première conferences on animal science. In its previous 70 editions, it has been attended by thousands of animal scientists and presented an incredible amount of papers, many of which reported world-first results that have been setting the standards for livestock industry and animal science.

This 71st edition will be no exception with its plenary session, 72 scientific sessions, and close to 1,100 technical contributions.

This year's conference is being run under exceptional circumstances. We started planning for the 2020 Annual Meeting nearly 2 years ago, the Portuguese colleagues even years before. The expectation was to run this in Porto with an expected record attendance close to 1,700 participants and prepared for a conference that maintained EAAP excellent technical standards and fun social events. Following much debate, we had to take the decision to proceed with the conference in the now realised alternative format. This was not without its own challenges.

With the support of the Scientific Commissions and, naturally, of the scientists sending abstracts submitted as presentations or posters, we have created both an exciting programme and conference structure which was designed to stimulate discussion and participation of attendees. While all papers are required to have a pre-recorded video presentation, the conference sessions will have life in them, presenters will be there to answer questions and technical discussions will be encouraged.

We certainly encourage all participants and attendees to attend and engage with sessions as-though you were here in person. In addition to attending scientific sessions conferences are always good for networking, to meet old friends and make new connections and friendships. Something which normally make EAAP meeting so unique. However, the Virtual Platform we are using has many features to allow you to contact and network with other attendees. Please do engage with our Annual Meeting as if you were in the traditional on-site meeting. Please look at the website and try the technology.

I hope that the use of this year virtual conference technology will offer us the experience for different types of future conferences combining physical and virtual therefore giving wider opportunities to animal scientists to participate.

I do hope that better times will come and that in 2021 we will meet in person in Davos (Switzerland). The Swiss organisers are already perfectly prepared to welcome us!

Matthias Gauly
President EAAP

Session 20 Theatre 4

Modelling approaches for sustainable insect production chains

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Insect value chains in Europe are evolving to large-scale industrial systems overcoming economic and environmental challenges. SUSINCHAIN, a H2020 EU-funded project, aims to define the leverages and solutions for sustainable insect value chains from multiple perspectives: economic, environmental, safety, nutritional, etc. Such perspectives have different weights and are often in contradiction to each other at various stages of the value chain. Currently, Life Cycle Assessment (LCA) is the standard for the assessment of environmental impact, allowing to consider multiple system criteria. However, LCA of emerging insect production systems is complicated due to the lack of data and low technology readiness levels. To use LCA efficiently and supply it with data, SUSINCHAIN is relying on modular modelling approaches chosen for ability to rely on already defined set of tasks and logics for time saving and flexibility. Moreover, modelling complexity behind entire insect system is divided into smaller solvable and rather simple tasks (models). For insect production chains, with biological agent in the core of the system, modelling approaches should include the biological nature of insect metabolism and rely on metabolic models. Such approach requires encoding of insect species genome (currently in the scope of a few research groups) and development of metabolic models themselves (in scope of UpWaste project). Metabolic models would provide the foundation for feed conversion models. However, such an approach might take long time and up to full disclosure of metabolic models, LCA of insect chains is relying on energetic, mass flow and environmental fate models. Economic aspect is included in a form of a price model to represent an effect of market influence. These models, representing various modules, are combined with multi-objective optimisation algorithms to define the optimal value chains, satisfying the needs of different actors in the chain. It is predicted that machine learning technique will be applied to adapt modules from similar systems (feed, food and processing) to the case of insect production to tackle the problem of data lack.

Session 20 Theatre 5

Precision insect farming: using sensors to monitor and steer the production process in real time

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Insect products are quite expensive in comparison to other protein rich food/feed sources. This is mostly due to high labour costs (60.9% of all production costs). VIVES developed on automated feeding system for mealworms (*Tenebrio molitor*). Using this system, instead of feeding by hand, labour costs could be reduced by 75%. The feeding robot can be further improved by the implementation of sensors to monitor temperature, moisture, emissions, etc. in the rearing boxes. A new research project at VIVES focuses in the first place on temperature. Our first results showed that fully grown mealworms could increase the temperature in the rearing boxes with 4 °C. When moisture source was added further increases of temperature could be observed. In addition, migration behaviour, shown when larvae are close to pupation, increased the temperature towards the corners of the boxes with 1 extra °C. The monitoring of the temperature in the boxes can reveal certain behavioural patterns. These patterns can be related to feeding state, mortality, developmental stage, etc. Moreover, the growth of the larvae could be monitored using temperature, given that heavier larvae generate more heath. The system could process all the data from the sensors and report to the operator. Consequently, targeted interventions can be made where necessary in order to assure optimal production (e.g. adjust the feeding substrate or regime). Ultimately, the system can learn to recognise the patterns and intervene independently in the production process.