
PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA
ADV
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ADVancedAGROecological approaches based on the integration of insect farming with local field practices in MEDiterranean countries

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GREETINGS FROM WP3 COORDINATOR

Ilaria Biasato graduated in Veterinary Medicine in 2013 at the Department of Veterinary Sciences (University of Torino, Italy). During the 2-year-period of her experimental thesis, she developed a strong interest towards the **pathological anatomy**, which pushed her to apply for the PhD in Veterinary Sciences for Animal Health and Food Safety. The topic of her PhD was related to the **utilization of insects as alternative feed ingredients in poultry nutrition** and exerted a deep influence on her future career. Indeed, during the PhD, her scientific interest gradually shifted from the pathological anatomy to the animal nutrition.

She successfully got her PhD in 2018, and after that she has developed increased knowledge and expertise in the animal nutrition and product quality field, progressively approaching to fish and insect species as well. She is currently an **Associate Professor** at the Department of Agricultural, Forest and Food Sciences (University of Torino).

Her research activity focuses on **farming and nutrition of poultry and fish species**, evaluating the influence of the use of **insect-based products** (live larvae, meals and oils) **on productive performance, gut health** (with a particular focus on the microbiota and/or microbiome) and **quality of the final products**. Furthermore, since 2020, her research activities also deal with farming and nutrition of the two insect species most used as feed ingredients (***Hermetia illucens*** **and** ***Tenebrio molitor***), evaluating the **effect of various by-products and/or agri-food waste** on their **growth performance, bioconversion efficiency, development, and nutritional profile**, and analyzing their nutrient requirements.

Prof. Biasato has published 84 scientific papers in peer-reviewed international journals and 2 book chapters, with around 20 conference presentations. Since 2019, she serves as **Scientific Editor** for the Journal of Animal Physiology and Animal Nutrition (**JAPAN**). She is also member of the Young Club of the Insects Study Commission of the European Federation of Animal Science (**EAAP**). She has served/serves as collaborator in international (**Horizon 2020, PRIMA, ERA-NET SUSFOOD2 and CORE Organic Cofunds**) and national (**Fondazione Ager, Fondazione Cariplo**) projects since 2016. She is currently the Project **Manager and WP3 Leader of the ADVAGROMED project**, and the **Research Unit Leader of the newRIFF project** (Fondazione Cariplo).

ADVAGROMED represents a special project to me, as it deals with two of the research topics I love the most (poultry and insects) and it is the first project in which I have an official responsibility. The first year and a half of ADVAGROMED has recently come to an end, and within the frame of the WP3 we already discovered a lot about the potential of including live larvae in the diet formulation for our native poultry strains. I am really lucky to share this experience with an amazing group of colleagues, and I am sure this will be only the beginning of a never-ending, fruitful collaboration. Keep following us!

WPs UPDATES:

WP2 Local agricultural by-products as substrate for insects

UNITO partner in Italy, prepared a total of **seven diets, named TM0 to TM6**, were formulated by IO on the basis of the chemical composition of the agricultural by-products collected. The formulation criteria included the final crude protein (15-16% on dry matter), ether extract (2.5-3% on dry matter) and cost.

The seven diets were prepared in small quantities (100 grams) and analyzed for their **chemical composition**. The dry matter, the crude protein, the ash and the ether extract content, as well as the aNDFom-NDF and the gross energy were determined for all diets. The large-scale trial was set-up to identify the **best diet in terms of larvae growth performance and chemical composition**. The crude protein levels in the TM3 and TM6 groups were comparable to CRTL, displaying higher values than TM2. Based on the above-reported results, the **TM6 diet was identified as the most effective substrate.**

USMS partner in Morocco evaluated in laboratory trials the **suitability of by-product-based compound diets for H. illucens larvae**. By-products collected from a **vegetable** market situated near the pilot unit facility at a distance of 4 km were used in the trials. Based on their annual availability, the selected by-products for larvae growing were: **apple, pumpkin, beetroot, eggplant**, whereas the **Gainesville** diet served as control. Five diets were evaluated, whereas each treatment was replicated 3 times. During the trial, the **daily weight, length and width of 10 larvae per box was recorded. Larval survival was also calculated**.

At the end, the average individual larval weight, the total amount and the dry matter of larvae were determined. According to the results, larvae are growing fast using **Gainesville**, followed by **eggplant** and moderately with **beetroot**. In general, these three diets showed high values in terms of **survival rate** and dry matter of larvae, indicating that they can adequately and efficiently support larval growth.

WPs UPDATES:

WP3 Local poultry breeds fed insect-derived products

In Italy, the trial assessing the **effects of live yellow mealworm larvae as feed ingredients for Bionda Piedmontese** chickens successfully started in mid-March, and it is going to end in mid-June. So far, the birds are easily accepting the live larvae in their diets. **Egg production** is monitored on a daily basis, and at the end of April the first investigations about bird performance, welfare, and egg quality will be performed.

In Spain, SERIDA partner performed a poultry (laying hens) trial between May and August 2023 using **Pinta Pinta breed**. The experiments consisted of three treatments (Control, H5% and H10%), with three replicates/diet and 10 animals/replicate. **Animal performances, welfare assessment and health investigations** were performed. Moreover the **egg physical-chemical quality** was assessed on eggs collected after 60 (T0), 120 (T1) and 180 (T2) days of the nutritional trial.

To conclude this trial also a **sensory evaluation** and **consumer acceptability test** has been performed on the eggs. The **consumer acceptance survey** was designed to gather information about the social, socioeconomic characteristics and the consumption habits of the **Asturian consumers**.

WPs UPDATES:

WP4

Use of insect frass and poultry manure in sustainable agricultural processes

In Italy, **CNR** conducted a **field trial with turnip** (a local variety cv. "novantina natalina") that started on November 2023 and ended in February 2024 (right picture). The insect frass utilized was **frass of *Tenebrio molitor*** (TM) that has been produced and provided from the insect facility of the UNITO partner.

The levels of TM insect frass and poultry manure distributed were calculated based on the nitrogen (N) content of these materials and the plants' requirements, which for these local varieties are 130 kg of N/hectare. Plant samples were collected at the end of the trial and have been freeze dried for the laboratory analysis, currently ongoing.

In Spain, the physicochemical characteristics of the **Pita Pinta manure and Hermetia illucens (HI) frass** were evaluated.
The manure was obtained from **SERIDA** trials (WP3) and the frass was provided by IO partner.
The frass was generated during the insect feeding trials which produced the larvae used by SERIDA for WP3.
Seed germination test to assess maximum/minimum dose of chicken manure and frass and detect potential toxicity for three plant species (**Brassica oleracea var. Viridis, Lactuca sativa and Phaseolus vulgaris var. Verdina**) were performed. Selected doses of chicken manure and frass will be tested in greenhouse trials and plant growth, root system growth, leaf relative water content and chlorophyll/carotenoid measurements will be measured.

WP DISSEMINATION

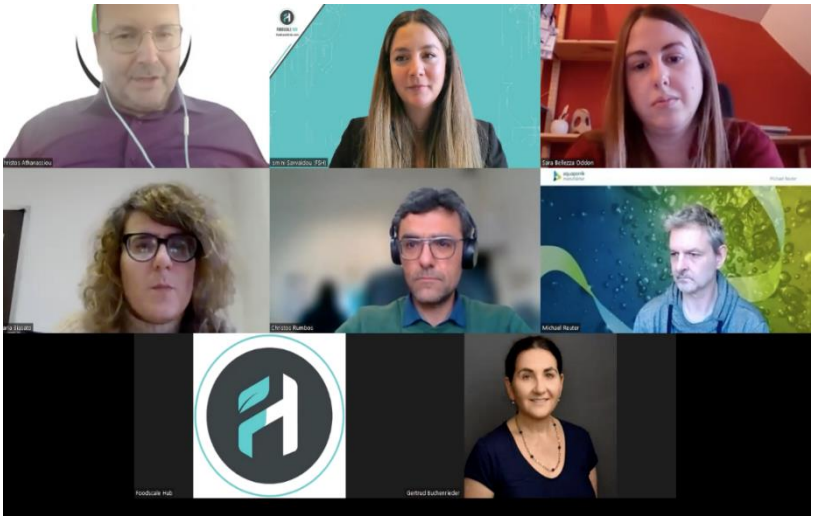
On **27th of February**, 2024, the research teams from the University of Turin (**UNITO**) and the University of Thessaly (**UTH**), represented the ADVAGROMED project and contributed as speakers to the webinar titled "**Insect Farming & Aquaponics: Leading the Way with FrontAg Nexus, CIPROMED & ADVAGROMED**."

The event took place online.

The webinar drew a total of 54 attendees who eagerly posed questions at the conclusion of the presentations.

Participants attended from a diverse array of countries, including **Germany, Belgium, the United Kingdom, Greece, Italy, Turkey, Kenya, Pakistan, Jordan, Morocco, and San Marino**, representing an international presence.

Sara Bellezza Oddon, type A researcher at UNITO, delivered an oral presentation focusing on **waste management through insects for food and feed**. Additionally, **Ilaria Biasato**, type B researcher at UNITO, presented the aims and scopes of the ADVAGROMED project, emphasizing on the various work packages and underscoring their interconnectedness.



The panel of hosts participated at the online webinar "Insect Farming & Aquaponics: Leading the Way with FrontAg Nexus, CIPROMED & ADVAGROMED."

WP DISSEMINATION

On the **27th March 2024, Prof. Laura Gasco**, coordinator of the ADVAGROMED project was the speaker of a seminar titled "**Insects for Animal Feeding**" organized for the master's students of the Department of Agricultural, Forest and Food Sciences at the University of Turin. The event took place in presence at the AgroVet Campus of the University of Turin in Grugliasco, Italy.

The aim of the seminar was to discuss about the **use of insects as feed ingredient to the main livestock diets**. Starting from breeding cycles, Prof. Laura Gasco described the extraordinary bioconversion capacity of the insect larvae, and their nutritional value. The seminar was an excellent opportunity to compare and share the results obtained within the ADVAGROMED project in terms of **sustainability, nutrient recycling** and **use of agro-food by-products**.

Thanks to the inputs generated by the project, it was possible to describe how insects are well suited to **meet the nutritional requirements of the main livestock species**. At the end of the seminar, participants requested more information about the project, and explanatory brochures were distributed to the audience.

STAKEHOLDER CORNER: EL.VI.Z SA

Good morning Mr. Chalkidis Vasileios and thank you for taking part to this interview, giving us the opportunity to know a professional point of view about this sector. Before starting, we would like to know more about you and your role within the ELVIZ industry. What is your professional background and your role in ELVIZ? Could you share a glimpse into your background and the unique contributions you and ELVIZ bring to the table?

I am the CEO and President of the **ELVIZ (HELLENIC FEEDSTUFF INDUSTRIES**) Board since 2012, with more than 20 years of experience in agri-businesses, crop cultivation, program management and animal feed production.
I transformed ELVIZ from a government-owned entity into a modern company operating with private financial criteria. Since its establishment, ELVIZ has been dedicated to **providing Greek livestock breeders with excellent quality feed**, consistently operating in the production and trade of animal feed for the last 50 years. Today, ELVIZ continues to invest in **mechanical equipment, develop new products, and enhance its human resources.** By doing so, ELVIZ aims to participate in new technologies, which will help to confront the current food problems and environmental issues.

When did ELVIZ started to operate and what are the main hurdles in feed production faced in 2024 that were absent in earlier years?

The company was founded in **1969**. The main hurdles in the production of animal feed in recent years have occurred due to the impact of the wars, the global crisis, as well as the shortage of raw materials, as well as the subsequent sharp increase in their prices.

Credits: EL.VI.Z SA

What sparked your interest in exploring insects as a potential source of animal feed? Was their sustainable production a key factor driving this decision?

Being one of the biggest animal feed producers in Greece, we are very keen to apply the outcomes of new technologies to support our activities in developing sustainable feed products based on alternative proteins through insect-based animal feed production. I believe that exploring insects as a potential source of animal feed will be the most impressive solution for animal feed production, in terms of protein source and sustainable production practices.

Recently the utilisation of insect as feed for poultry and pigs has been approved by the EU following the previous authorization for aquaculture species. How do insects compare to traditional animal feed utilized in Greece in terms of nutritional value? Are there any particular insect species that you find to be especially promising or effective as feed sources?

Credits: EL.VI.Z SA

European agricultural production systems heavily rely on **imported proteins** to meet the nutritional demands of livestock. As a result, there is a need to identify effective, sustainable and locally available alternative protein sources., yet no production units have. **In Greece, there is a considerable interest in the production of insect-based animal feed** been established until now. potential as well. In our opinion, the most promising insect species to be used as feed sources are the yellow mealworm, **Tenebrio molitor**, and the black soldier fly, **Hermetia illucens**, without excluding other insect species with great

Within the ADVAGROMED project one of the objectives for UTH partner is to utilize Greek agricultural by-products as feeding substrate for insects and then use live insects as feed for slow growing turkeys. According to your experience, are consumers favorable of the possible use of live larvae in these types of farming? And how do you educate consumers and potential clients about the benefits of incorporating insect-based feeds into their animals' diets?

Consumers are not yet familiar with the concept of using **insect-based feeds in animal production**. However, we believe that once they understand the economic benefits and efficiency of this method, consumer favorability will increase. It is crucial to **educate consumers** and **assure** them that incorporating insect meals into animal diets is **safe** and complies with relevant safety rules.

Credits: EL.VI.Z SA

Consumer education efforts will include distributing **leaflets, conducting workshops**, as well as advertising the topic in the **press**. Additionally, promotional materials will need to emphasize to the safety aspects of this innovative method.

Can you walk us through the process of sourcing and producing insect-based feed products? As the sector of insect-based animal feed is in its infancy, do you foresee advancements in the field of insect-based feed production in Greece?
If yes, in what ways do you see the market for insect-based feed products evolving in the coming years?

A huge volume of livestock and crop residues, alongside various by-products are produced by agricultural production. An **integrated approach** must be adopted to extract proteins from agri-industrial by-products, from legume biomass, as well as from insects. **Feed production units utilizing insects** must be incorporated into animal feed production **research programs in Greece**. There is a significant demand to explore and develop effective, environmentally sustainable sources for alternative protein production.

As we approach the conclusion of our interview, a question that may naturally arise for our readers, given your experience, is: What guidance would you offer to potential businesses or entrepreneurs looking to venture into the insect-based feed market?

Based on my experience, **protein production through innovative techniques**, including insect farming, is crucial and necessary, because they are **environmentally friendly** when compared to traditional methods. Therefore, **guidelines** should strongly encourage investments in insect meal production due to the bright and promising perspectives that this technology offers.

Credits: EL.VI.Z SA

Thanks to Mr. Chalkidis Vasileios for giving us such an interesting talk, for more info please visit the website https://www.elviz.gr

Follow them also on:

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UPCOMING EVENTS

14 – 16 MAY, 2024
POTSDAM, GERMANY

INSECTA International CONFERENCE

19 – 22 JUNE, 2024
SINGAPORE

INSECTS TO FEED THE WORLD
Singapore 2024
19th - 22nd June

1- 5 SEPTEMBER 2024
ITALY

EAAP · EUROPA · 2024 · FLORENCE · ITALY · FEZ · EVT · EAX · 75th

EAAP 2024 will host a **specific session** dedicated to the **ADVAGROMED PROJECT!!**

More info in the link below: https://eaap2024.org/proposed-sessions/

PARTNERS
Discover the teams involved

ADV agro MED

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UNIVERSITY OF THESSALY

DIL

Consiglio Nazionale delle Ricerche
ISPA
ISTITUTO DI SCIENZE DELLE PRODUZIONI ALIMENTARI

SERIDA

جامعة السلطان مولاي سليمان
Université Sultan Moulay Slimane

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