



ADVAGROMED

ADVanced **AGRO**ecological approaches based on the integration of insect farming with local field practices in **MED**iterranean countries

Ancona, 23-25 January, 2024



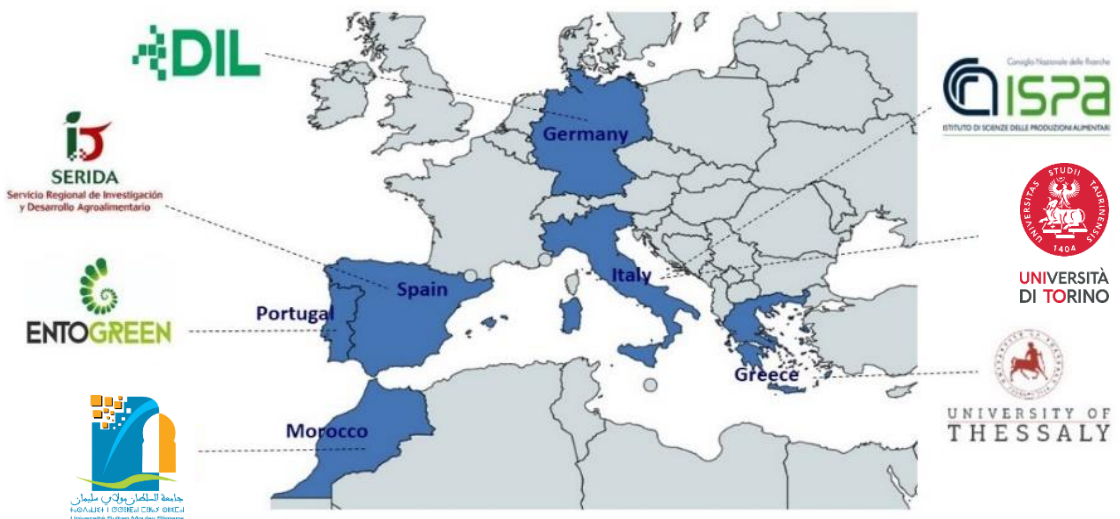
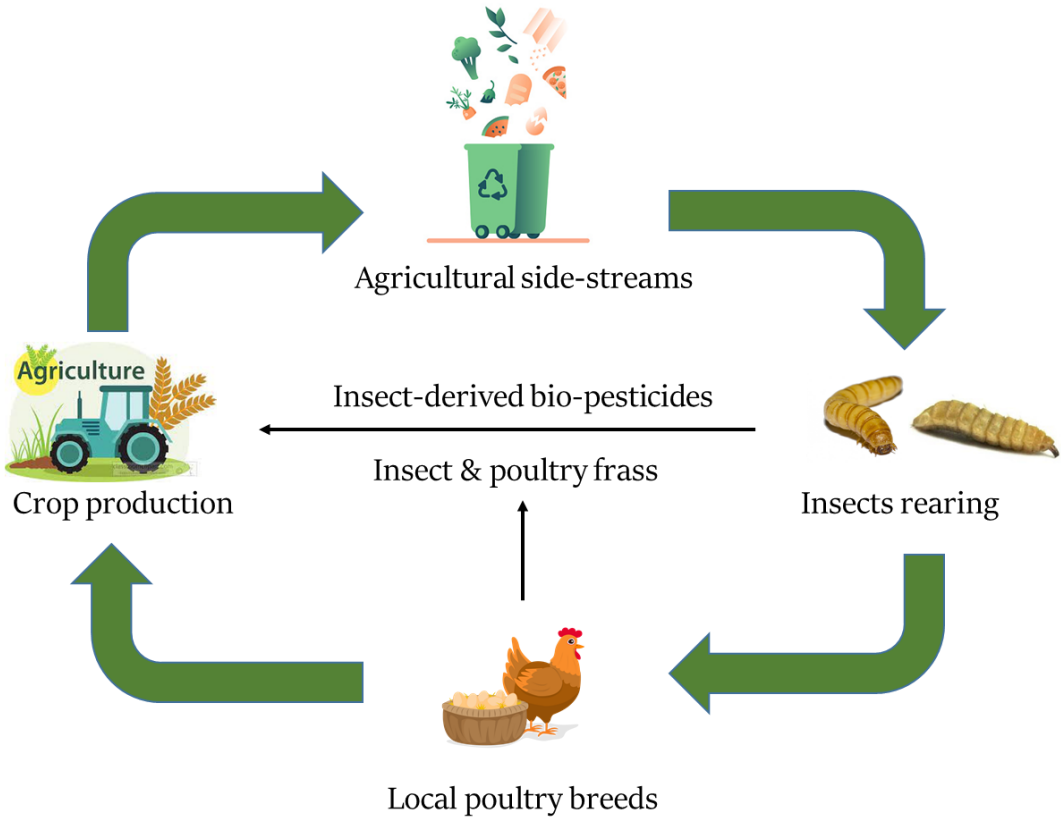
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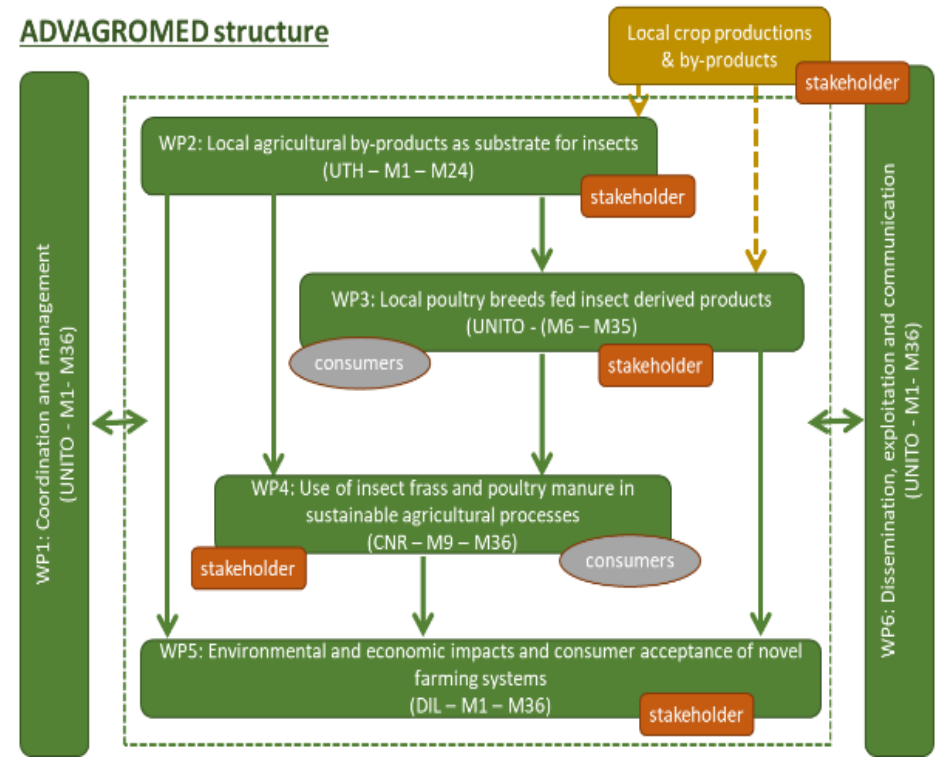
cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY



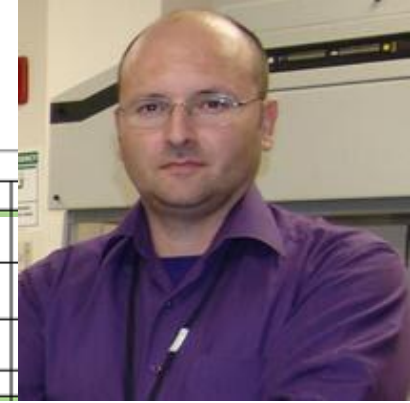
PRIMA 2021 – Section 2



ADVAGROMED structure



WP2. Local agricultural by-products as substrate for insects [M1-24; UTH]



ADVAGROMED Gantt Chart		Project months																												
WP2	Local agricultural by-products as substrate for insects	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
T2.1	Collection and nutrient composition analysis of agricultural by-products						D2.1																							
T2.2	Evaluation of agricultural by-products as ingredients of insect diets																									D2.2				
T2.3	By-products availability plan and storage strategies																									D2.3				



- T2.1** Collection and nutrient composition analysis of agricultural by-products
- T2.2** Evaluation of agricultural by-products as ingredients of insect diets
- T2.3** By-products availability plan and storage strategies

Technologies transfer

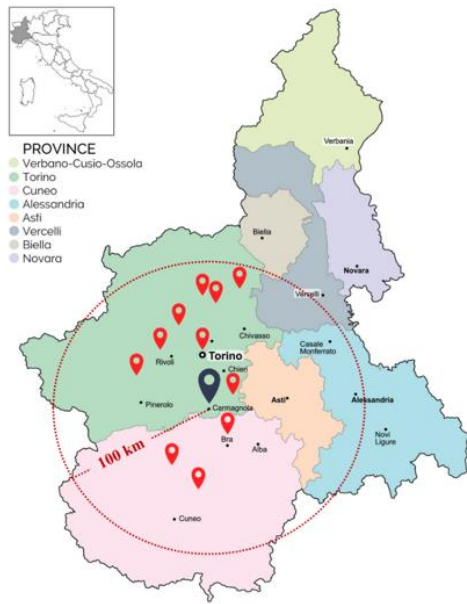
Table 1. Main crops cultivated in the Region of Thessaly.

Crop	Cultivated area [Ha]	Percentage of total cultivated area [%]
1 Durum wheat	131,154	29.97
2 Cotton	122,746	28.05
Cereals [except durum wheat]	46,633	10.66
Maize	33,559	7.67
Olives	33,556	7.67
Animal feed grains	31,287	7.15
Dried fruits	12,180	2.78
Vegetables	7,693	1.76
Industrial crops	5,799	1.33
Apple	4,604	1.05
Vineyards	3,768	0.86
Stone fruits	2,374	0.54
Legumes	2,072	0.47



Table 3. Proximate composition [dry matter (%); protein, ether extract and ash content (%DM)] of the by-products that were selected for further evaluation as insect feed ingredients by UTH (n=3).

By-products	Dry matter [%]	Protein [% DM]	Ether extract [% DM]	Ash [% DM]
1 Lupin by-product	96.4	34.2	5.4	4.0
2 Triticale by-product	96.0	11.4	1.2	2.0
3 Oat by-product	95.6	14.6	4.8	6.6
4 Barley by-product	95.3	9.8	1.9	11.4
5 Pea by-product	94.6	48.3	2.6	6.9
6 Rice bran	91.7	17.4	15.4	7.7
7 Rice hulls	96.1	7.2	1.4	17.2
8 Spent mushroom substrate	97.9	7.6	0.2	13.0
9 Hempseed press cake (meal)	91.9	23.7	6.9	2.0
10 Hempseed by-product (class I)	86.0	15.5	10.6	7.3
11 Hempseed by-product (class II)	86.6	6.1	3.2	5.4
12 Hempseed by-product (class III)	86.9	14.4	11.4	6.2
13 Cotton by-product (class I)	89.5	21.4	15.9	0.4
14 Cotton by-product (class II)	89.0	25.6	1.2	4.2
15 Cotton cake	88.6	28.1	6.8	4.5
16 Cotton gin trash	85.5	11.4	3.2	25.5



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DI TORINO

•Companies-selected-(red-points)-and-distance-from-the-experimental-centre-(black point).•

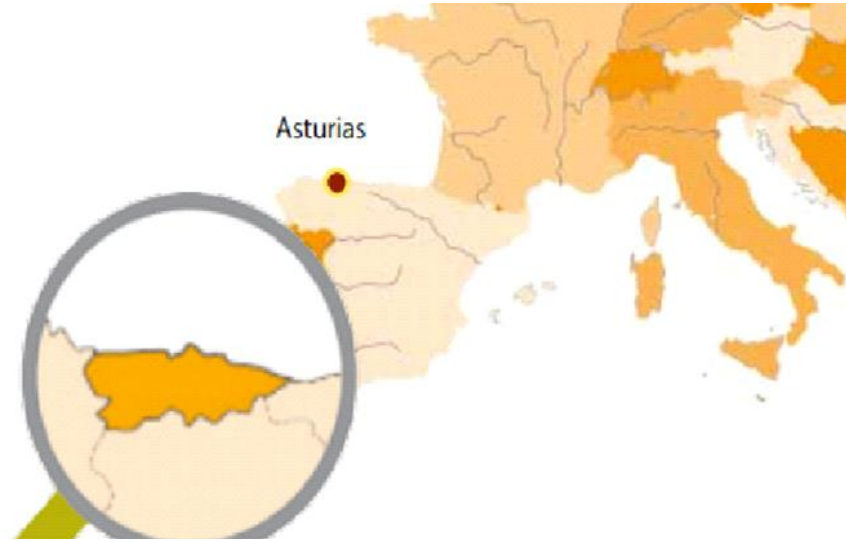
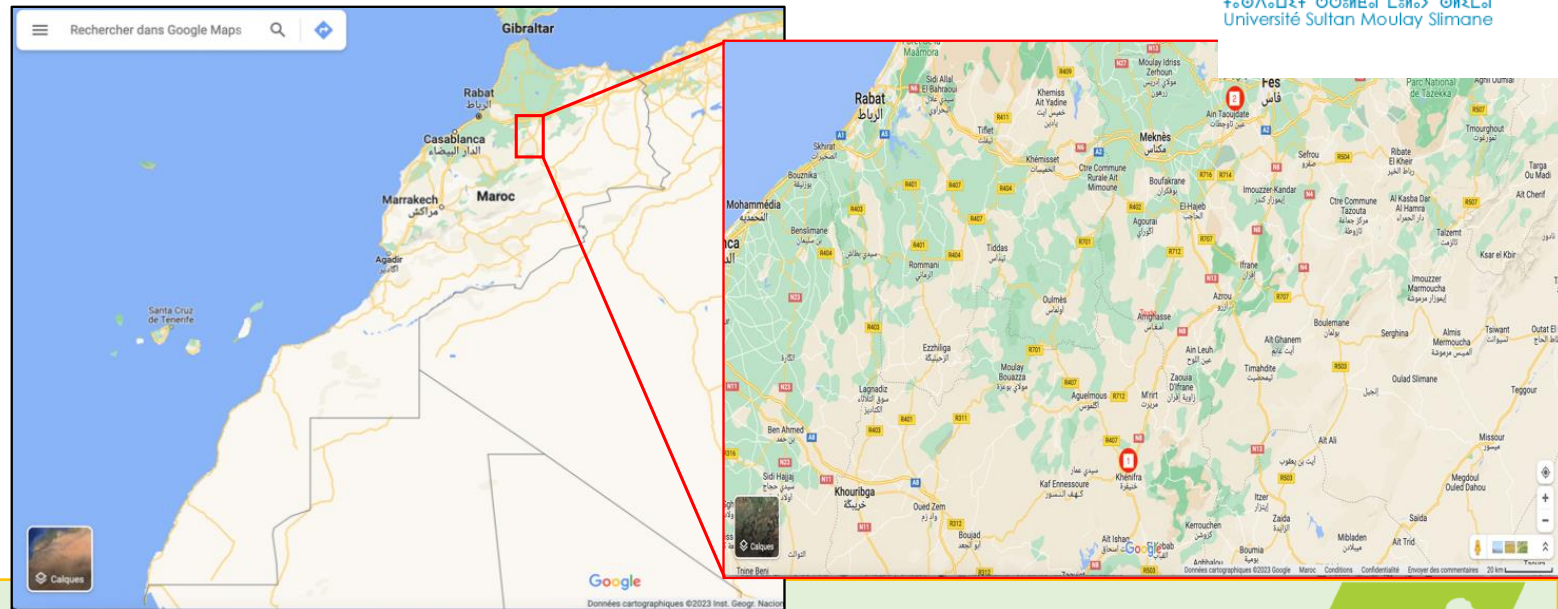


Figure 14. Location of Asturias in northern Spain.



جامعة السلطان مولاي سليمان
جامعة سلطان مولاي سليمان
Université Sultan Moulay Slimane



Waste collection



1

Distance

2

DM content

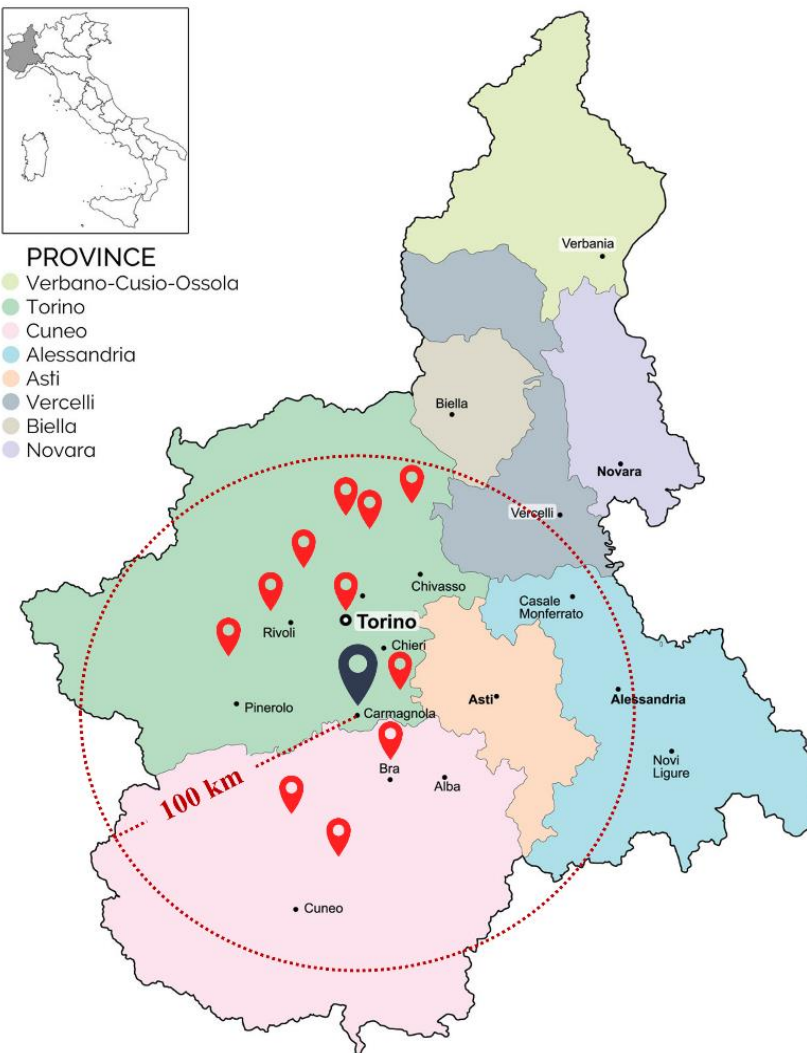
3

Cost



PROVINCE

- Verbano-Cusio-Ossola
- Torino
- Cuneo
- Alessandria
- Asti
- Vercelli
- Biella
- Novara





Waste & by-products



16 waste
or
by-products



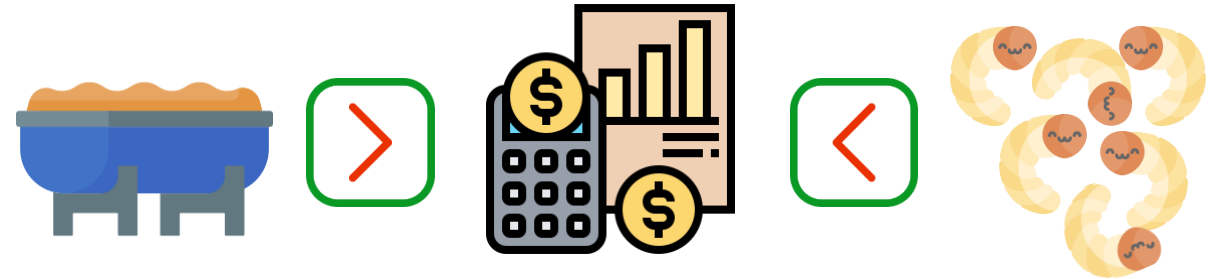
full chemical characterisation



Diets


7 diets formulated

ITEMS	TM2	TM3	TM6
Wheat groats	5,0	-	-
Wafer dough	5,0	2,3	-
Dry vinasse	6,3	-	-
Silvery film	7,5	-	-
Breeding waste	36,5	17,6	11,8
Feed waste	39,7	78,1	81,2
Panettone	-	2,0	-
Rice husk	-	-	3,0
Rice chaff	-	-	2,0
Rice middlings	-	-	2,0

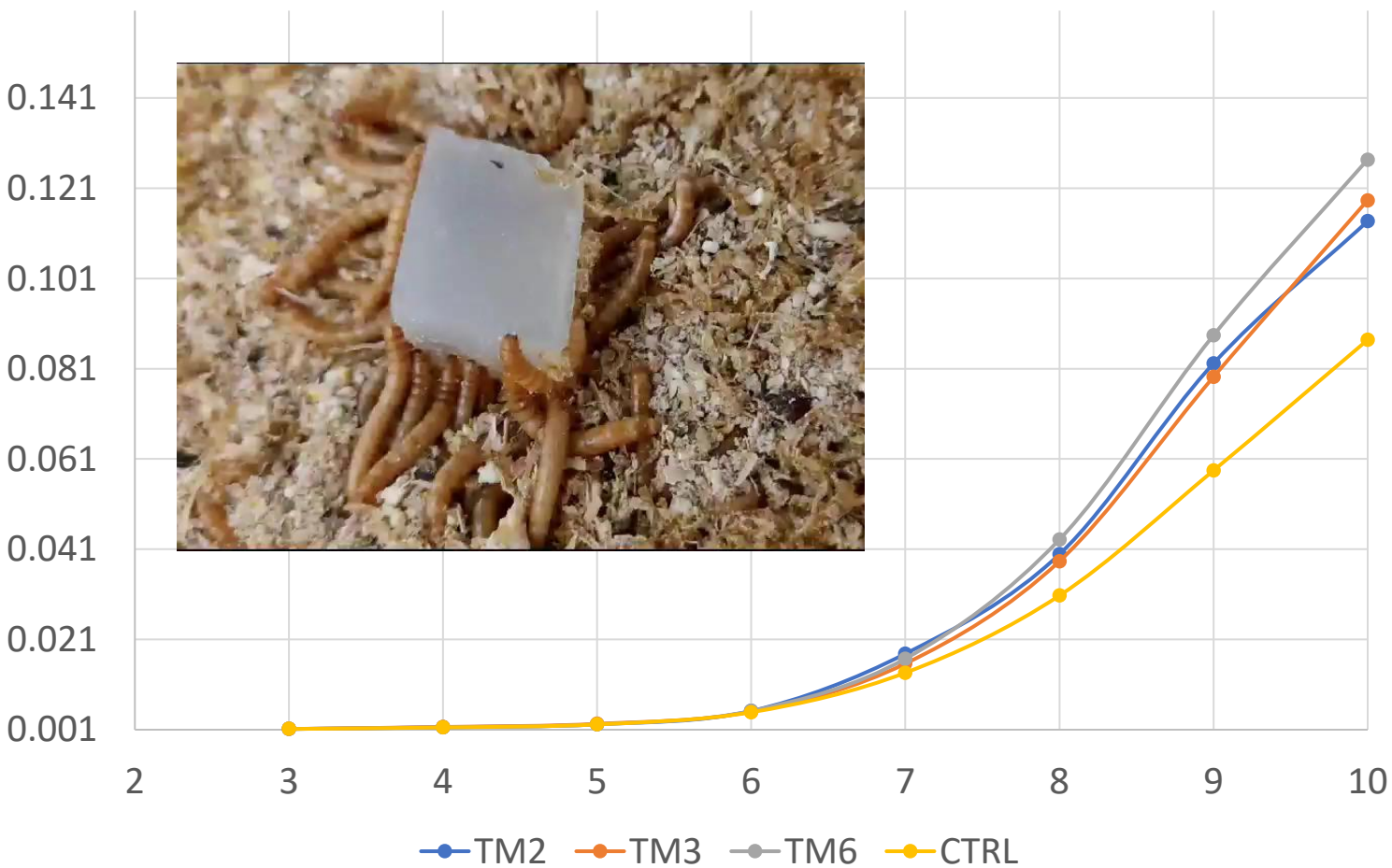


TM2 87,8 €/ton 

TM3 83,3 €/ton 

TM6 95,5 €/ton 

Results - growth curve



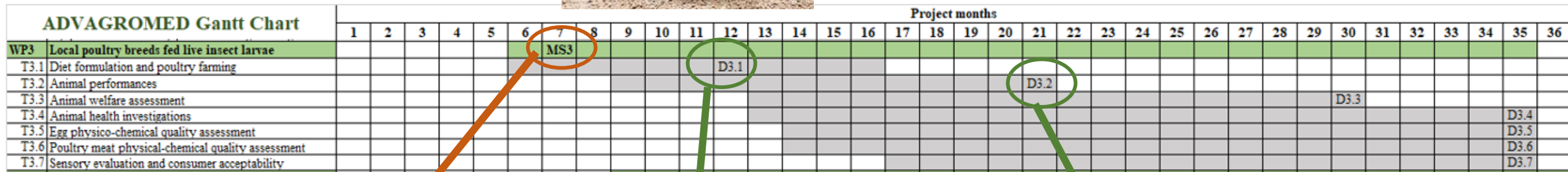
WP3. Local poultry breeds fed live insect larvae [M6-35; UNITO]



	Poultry breed	Larvae	Product
UNITO	Bionda Piemontese	TM	Eggs
UTH	Local type turkeys	TM	Meat
SERIDA	Pita Pinta	HI	Eggs
USMS	Beldi chicken	HI	Meat

	Dietary treatments		
	Control	TM5 (or HI5)	TM10 (or HI10)
Core diet	90	90	90
Feed mix	10	5	-
Live larvae	-	5	10

ADVAGROMED Gantt Chart



MS3 Ethical Committee approval for animal trials

D3.1 Core diet formulation

D3.2 Animal performance

Technologies transfer





Local poultry breeds are reared in four Mediterranean countries and fed live insect larvae to investigate:

- animal performance (T3.2)
- animal welfare (T3.3)
- animal health (T3.4)
- products quality – eggs (T3.5) & meat (T3.6)
- sensory evaluation (T3.7)



***Tenebrio molitor* (TM) larvae from WP2 (UTH and UNITO)**

***Hermetia illucens* (HI) larvae from WP2 (IO and USMS)**



Local turkey breeds (UTH, local TM larvae)



Bionda Piemontese hens (UNITO, local TM larvae)

Pita Pinta hens (SERIDA, HI larvae from IO)



Beldi chickens (USMS and TIMICHA, local HI larvae [IO supervision])



WP5. Environmental and economic impacts and consumer acceptance of novel farming systems [M1-36; DIL]

ADVAGROMED Gantt Chart

		Project months																											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
WP5	Environmental and economic impacts and consumer acceptance of novel farming systems												MS4																
T5.1	LCA and LCC of novel farming systems																												
T5.2	SLCA and consumer perceptions																												
T5.3	Optimisation of environmental (biodiversity) and social (farmers) wellbeing																												
T5.4	Development of sustainability communication strategies																												



MS5 Goal, scope and LC models defined

D5.1 Sustainability report

D5.2 Social impact and consumer acceptance report

D5.3 Sustainable optimisation strategies and their efficient communication

D5.4 Sustainability communication strategy report

WP6 – Dissemination, Exploitation and Communication



Larve di insetti per allevamento sostenibile, progetto UniTo

Prove di alimentazione per polli con larve vive

Redazione ANSA

TORINO

01 settembre 2022

12:45

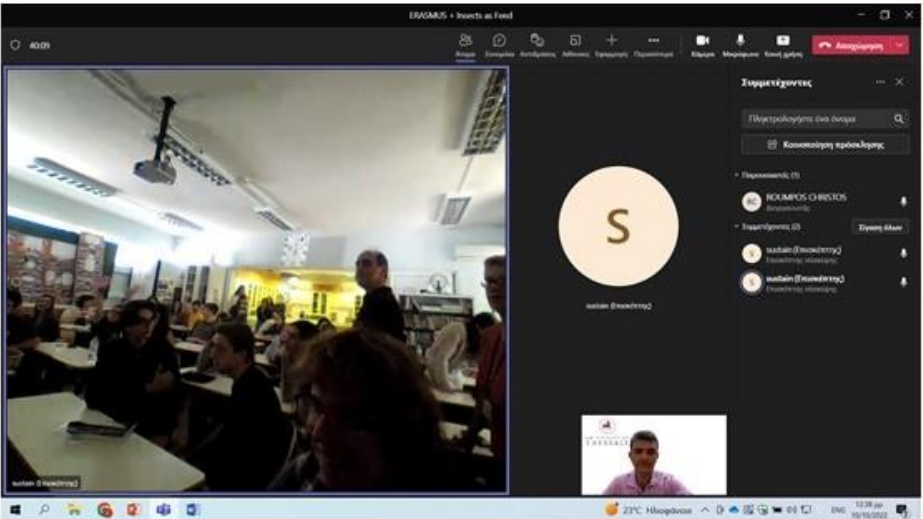
NEWS

Suggerisci

Facebook



- Press release for ADVAGROMED (kickoff meeting September 2022) (UNITO)
- International Breed Poultry Fair Villa de Gijon (Sept 2022) (SERIDA)
- Press release for ADVAGROMED in the newsletter of the Entomological Society of Greece (September 2022) (UTH)
- Presentation of ADVAGROMED in an ERASMUS+ project "SUSTAIN US" (10-14th October 2022)
- IPIFF conference
- Instagram



PRIMA PROJECTS DAY

Sitges (Barcelona) | 21st November



The PRIMA programme is supported by Horizon 2020, the European Union's Horizon 2020 research and innovation



ADVAGROMED

ADVanced AGROecological approaches based on the integration of insect farming with local field practices in MEDiterranean countries
Section 2



Thematic Area: – Farming systems
Budget: 1.296.161,20 €
Duration: 36 months
Project website: <https://www.advagromed.com/>

State and Coordinator entity:
ITALY
University of Turin

Scientific Coordinator:
Laura Gasco
Email address: laura.gasco@unito.it



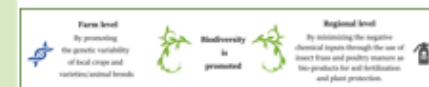
Other in Consortium:
UTH - GREECE; DIL - GERMANY; CNR - ITALY; USMS - MOROCCO; SERIDA - SPAIN; ENTOGREEN - PORTUGAL

Problem statement and key objectives



The aim of **ADVAGROMED** is to develop a "new", innovative, holistic agricultural production system based on agroecological principles and circular economy practices.

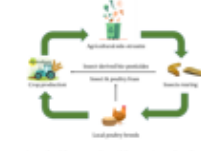
ADVAGROMED introduces sustainable farming practice to increase the resilience of the agro livelihood systems. Using a multi-actor approach **ADVAGROMED** applies the Circular Economy / zero waste principle developing a sustainable and innovative farming system in the Mediterranean Area.



Brief summary of the methodology

ADVAGROMED uses by-products of local agricultural productions for rearing insects (**Hermetia illucens** and **Tenebrio molitor**), which deliver different products:

- 1) insect frass to be used as fertilizer to improve farm soil quality, enhance plant health and soil microbial biodiversity, and deliver an antimicrobial effect (decreasing the use of inorganic fertilizers and pesticides), and
- 2) live larvae to feed local poultry breeds ensuring good animal performance, health and product quality, decreasing the use of imported feeds.



ADVAGROMED research activities

- help the Mediterranean agricultural production systems to **make better use and exploit locally available resources**, such as the **agricultural side-streams**, for the local production of feedstuff rich in nutrients (insect) to decrease the dependency on imported ones;
- improve **economic and social resilience of Mediterranean smallholder farming systems** to **climate change** through the valorisation of agricultural by-products, the production of new products to improve soil quality or use as poultry feed. **ADVAGROMED offers to the local farmers an alternative farming system** with small failure risk and able to generate entrepreneurship, employment and income;
- **contribute to the zero waste farming systems**;
- **decrease the use of chemical inputs and develop alternative solutions**: insect frass are used as sustainable **biofertiliser**, pesticide and plant immune stimulant, offering a sustainable solution for fertilisation;
- **Increase** the stability and resilience of Mediterranean smallholder farming systems through the proper exploitation of locally available organic side-streams, and their up-cycling and bioconversion to nutrients (insect biorefinery);
- **engage youth and empower women** using a participatory approach. **ADVAGROMED** equips skilled youth / women to increase their employability so that they can access meaningful and sustainable employment, and self-employment through entrepreneurship;
- **encourage consumption of food produced using more sustainable practices**.

This project is part of the PRIMA Programme supported by the European Union's Horizon 2020 research and innovation programme



The PRIMA programme is supported under Horizon 2020, the European Union's Framework Programme for Research and Innovation

PARTNERS



NATIONAL FUNDING AGENCIES

- Italy: Ministry of Universities and Research (MUR)
- Greece: Hellenic Republic (Greece), General Secretariat for Research and Innovation of the Ministry of Development and Investments (GSRI)
- Germany: Federal Ministry of Education and Research (BMBWF)
- Morocco: Ministry of Higher education, scientific research and innovation (MERSPI)
- Spain: Spanish State Research Agency (AEI)
- Portugal: Fundação para a Ciência e Tecnologia (FCT)

CONSORTIUM

ADVAGROMED brings together 7 leading partners from six countries across the Mediterranean Area: five EU Member States (Greece, Germany, Italy, Spain and Portugal) and one non-EU countries (Morocco). The consortium is represented by three Academia partners (UNITO, UTH, USMS), three research institute partners (CNR, DIL and SERIDA) and one company (ENTOGREEN).



LET'S GET IN TOUCH:



Advagromed
 Advagromed project



Funded by the European Union



PRIMA

The Prisma program is an Art. 185 initiative supported and founded under Horizon 2020, the European Union's Framework Programme for Research and Innovation



ADVanced AGROecological approaches based on the integration of insect farming with local field practices in MEDiterranean countries

WHY ADVAGROMED?

The **intensification of current agricultural production systems** is one of the primary drivers of **biodiversity loss**.

Therefore, urgent systemic changes in the current agricultural practices are needed to address this issue. Agro-biodiversity is a vital sub-set of biodiversity, and refers to the diversity in agro-ecosystems.



Agro-biodiversity is the result of interaction among the environment, genetic resources and management systems and practices, encompassing the variety and variability that are necessary for sustaining food production and food security.

ADVAGROMED thus aims to develop, evaluate and promote- through a collaborative research- **an innovative farming system** adapted to the unique Mediterranean conditions by exploiting the **advantages of insect production** in conjunction with **basic agroecological principles**.

OBJECTIVES

THE MAIN OBJECTIVE OF ADVAGROMED IS TO INTRODUCE SUSTAINABLE FARMING PRACTICES TO INCREASE THE RESILIENCE OF THE AGRO LIVELIHOOD SYSTEMS BASED ON AGROECOLOGICAL PRINCIPLES.



ADVAGROMED applies the **Circular Economy / zero waste** principle developing a sustainable and innovative farming system in the Mediterranean Area. **ADVAGROMED** uses by-products/organic waste of **local agricultural** productions for rearing insects delivering different products:

- 1) **insect frass** to be used as fertiliser to improve farm soils, to enhance soil quality, microbial biodiversity, and to deliver an antimicrobial effect (decreasing the use of inorganic fertilisers and pesticides),
- 2) **live larvae** to feed local poultry breeds ensuring good animal performances, health and product quality (decreasing the use of imported feeds).

- brochure to be translated
- social networks
- Website (please send info and photo!)

website: <https://www.advagromed.com/>







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<https://www.advagromed.com/>