

Galleria mellonella Rearing: A Niche Insect for Sustainable Feed Production

Problem/Challenge

The global demand for animal protein, particularly for feed, places significant strain on land and water resources, contributing to environmental impact. There's a growing need for alternative, low-input protein sources and efficient ways to valorize organic waste, aligning with the circular economy principles of the Water-Energy-Food-Ecosystem (WEFE) Nexus.

Our Solution/Key Finding

The FrontAg Nexus project investigated the small-scale rearing of *Galleria mellonella* (wax moth) larvae as a valuable, protein- and fat-rich feed ingredient. These larvae can be produced with low water requirements and show potential for waste valorization if fed on suitable alternative diets, offering a promising niche in sustainable feed production.

Benefits & Impact

Galleria mellonella offers a nutritious feed alternative for livestock and pets, requiring minimal water input (no added water needed if fed vegetables) [1]. Its production can be integrated into circular agricultural systems by converting certain organic wastes, reducing environmental footprint compared to conventional feeds. This contributes to resource efficiency and diversification of protein sources within the WEFE Nexus.

Practical Recommendations

Producers should focus on maintaining optimal rearing conditions (30–32°C, 60-70% humidity, total darkness) and managing life cycles (25-30 days to maturity). Explore using alternative, less expensive waste-based diets to reduce production costs.

Applicability Box

Theme: Niche Insect Production, Sustainable Animal Feed, Waste Utilization

Keywords: *Galleria mellonella*, Wax Moth, Insect Feed, Sustainable Protein, Low-Input, Waste Valorization

Context: Small-scale feed production, pet food, aquaculture, waste management.

Required Resources: Climatic chamber/incubator, non-toxic plastic boxes, appropriate feed substrate (e.g., corn flour, wholemeal flour, or alternative wastes), technical knowledge of insect rearing.

Scalability: Adaptable for small-scale and decentralized production.

Readiness Levels: Emerging TRL (for specific applications), BRL/SRL still developing due to regulatory landscape and market acceptance for new feed ingredients [2].

Risk Management/Considerations: Navigating evolving regulations for insect feed, finding cost-effective and safe waste-based diets, ensuring product quality/safety. While not widely approved for human consumption, *Galleria mellonella* has palatability potential.

References and Further Information

- [1] E. Appolloni, A. Morelli, S. Francati, C. Peri, F. Orsini and M. L. Dindo, "How to produce *Galleria mellonella* in a small-scale insect farm," FrontAG Nexus Implementation Guide, Bologna, 2024.
- [2] E. Appolloni, V. Cerasola, G. Pennisi, W. Biru, G. Buchenrieder, T. Uyar and Y. Yavuz, "D1.1: Systematic literature review (SLR) of frontier agriculture systems and empirical evidence in the Mediterranean Region," FrontAG Nexus Project Deliverable, Bologna, 2023.

About this practice abstract

Publisher: FrontAg Nexus

Authors: E. Appolloni, A. Morelli, S. Francati, C. Peri, F. Orsini, M. L. Dindo (University of Bologna (UniBo))

Contact: Francesco Orsini (UniBo), f.orsini@unibo.it

Review: M. Reuter (aquaponik manufaktur (APM))

FrontAg Nexus: The project was launched in May 2023 to promote sustainable agri-food practices by applying the Water-Energy-Food-Ecosystems (WEFE) Nexus approach. Focusing on six Mediterranean countries—Israel, Italy, Morocco, Tunisia, Turkey, and Jordan—the project addresses climate change, resource scarcity, and food insecurity through collaborative research and innovation.

© 2025

Project Website: <https://frontagnexus.eu>

Funding



This work is part of the FrontAg Nexus project. This project (GA n° [2242]) is part of the PRIMA program supported by the European Union.



**Co-funded by
the European Union**

Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.