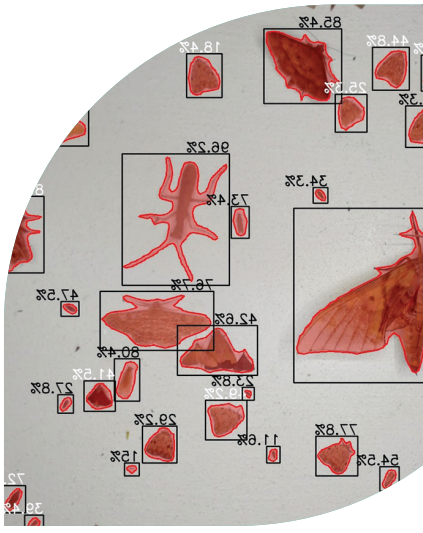
MAMBO Modern approaches to the monitoring of biodiversity

FACT SHEET

Light camera traps for monitoring of nocturnal pollinators

DESCRIPTION



The UKCEH Automated Monitoring of Insects (AMI-trap) is an autonomous light-trap system developed by UKCEH to support large-scale, standardised insect monitoring. It integrates UV and LED light sources with a high-resolution camera and motion-detection software to capture images of nocturnal insects, primarily moths and pollinators, attracted to the trap. The system is controlled by a Raspberry Pi computer, with on-board data storage and power management enabling fully autonomous operation in the field.

The AMI-trap builds on an original design from Aarhus University and combines computer vision with autonomous imaging to capture images of insects, locate them within the image, and classify them to species level. Cameras capture insects landing on a uniform white background board, and the image analysis pipeline incorporates motion-informed object detection, instance segmentation of individual insects, and hierarchical classification, first at order level and subsequently to species level for Lepidoptera. A tracking algorithm de-duplicates detections of the same individual across multiple images. The system generates detailed outputs including CSV files with temporal, taxonomic and spatial information, labelled videos, insect crop images, and track visualisations.

The trap records images every two seconds and is capable of processing over one million recordings per season per device. It is modular and adaptable, supporting integration with mains, battery, or solar power supplies, and has been deployed in more than 30 countries across the UK, Europe, North America, Africa, and Latin America.

Funded by the European Union

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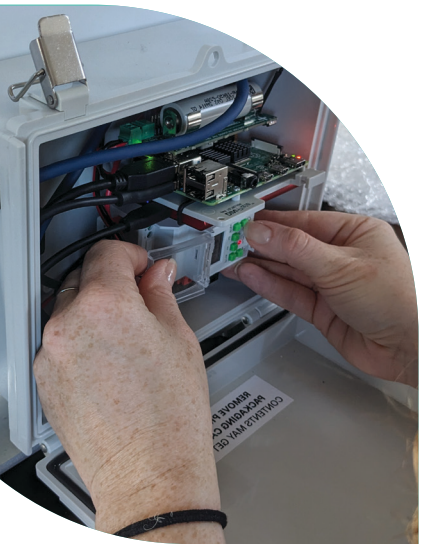
BENEFITS OF USING THE TECHNOLOGY

The AMI-trap delivers standardised, continuous, and non-invasive monitoring of nocturnal insect populations with minimal human intervention, capturing high-quality images suitable for species identification and generating rich, verifiable biodiversity datasets at scale. By correcting for short-term variation in weather conditions and light attractivity, it ensures comparable results across sites and over time. Its fully autonomous operation, robust weather-resistant design, and flexible power options make it well suited to long-term deployment in remote or challenging environments. Images can be processed with AI tools developed as part of MAMBO, where machine learning scientists openly contribute global and regional computer vision classifiers. Scalable from individual plots to entire landscapes and biogeographical regions, the AMI-trap has strong potential to support the EU Pollinator Monitoring Scheme and broader efforts to assess and address insect declines.



TARGET USERS

- Research organisations and universities studying insect populations, biodiversity change, or ecosystem health
- Conservation agencies and NGOs monitoring threatened species or habitats
- Environmental regulators and government bodies responsible for biodiversity assessments
- Agricultural and land management organisations tracking pest and pollinator activity
- Advanced citizen scientists with technical capacity to work with GitHub-based image analysis tools