

EBOCC Online Workshop 1: Moth sampling and light traps

8.10.2026, Teams



Aims of the workshop

- Moth monitoring: requirements stated in the Delegated Regulation (DR), and the things optional for each MS to decide.
- Optional trap types – their pros and cons.
- Practical considerations on how to organise the field work.
- Guidelines for handling, photographing and identifying the moths.
- **Chance for each of you to ask questions, share experiences, and discuss solutions for difficult issues faced in the preparations; and to get feedback on these from EC.**

Contents of the workshop

- 1. Overview on EU-PoMS and the requirements from Delegated Regulation
- 2. Optional trap types
- 3. Results and experiences from pilot studies
- 4. Practical considerations for organising the data collection
- 5. End discussion
- 6. Synthesis and next steps

1.1 Moth monitoring as part of EU-PoMS 1

- EU-PoMS consists of separate monitoring of four pollinator taxa:
 - Butterflies and day-active macro-moths (transect walks)
 - Bees (transect walks)
 - Hoverflies (transect walks)
 - Night-active macro-moths (using light traps)
- Moth monitoring will take place at all sites, with two light traps each.
- All will be sampled once a month* during the same observation period.

*with certain exemption rules.

1.1 Moth sampling as part of EU-PoMS 2

- All observed pollinators should be identified at species level.
- Commission intends to provide **an open-source shared app** for recording field data, as well as taking photos for ex-situ identification.
 - Tender for the app is currently open (until 19/10).
 - Optional to use for the MS.
 - The app will not include an identification tool.

1.2 Requirements from the Delegated Regulation

- Same sites and observation period as for the other pollinator groups.
- Data collection to be done once a month.*
- Light source output in the range of 350-550 nm (UV...blue/green).
- Two led traps per each site, positioned with certain criteria:
 - 50+ m from each other & artificial light; 10+ m from water; light source at 30-100 cm height; 1+m open space
- Each trap location georeferenced and defined as Forest, Agriculture or Other.
- Six environmental parameters recorded on each monitoring event.
 - Plus any other relevant parameters affecting data collection.
- Light trap design and light source type should be kept unchanged throughout the assessment period.

1.3 Left for each MS to decide

- Start and end of the observation period for all taxa*
- Which kind of trap to use, and how to obtain them
- Power and exact wavelengths of the light source*
- Exact positioning of each trap
- Use of photography and AI assistance in species identification
- Length of each monitoring event: from dusk till dawn, or fixed hours**
- Exact principles for measuring the environmental parameters**
- In difficult conditions, possible use of killing agents**
- Operating procedures (placement of traps, routines for emptying them** etc.)

*fulfilling the criteria in DR.

** Among the topics to be discussed today

2. Features of optional trap types

- Several optional trap types have been developed in many countries; we at EBOCC are not likely to know all of them.
- All trap types are relatively costly, in the range of 300-500€/piece.
- All are quite sizeable (50-60 cm high) > consequences for logistics.
- Some basic understanding of electronics is needed in working with the lamps and powerbanks.

2.1 Basic option: Dutch trap (by de Vlinderstichting)

- Widely used in the Netherlands in citizen science monitoring.
- A large 27L bucket with a lid, and a funnel, lamp and plexiglass plates placed on top of it.
- Egg boxes placed inside to provide moths with a secure substrate to settle on.
- Requires flat ground for placing > difficulties in mountainous areas.



2.2 “Dutch trap” supplemented with a roof

- Developed on the basis of the Dutch one.
- Used at least in Ireland and Finland.
- Roof provides shelter in the case of rain – also increases the catch to some extent, as it partly prevents moths from escaping the light.
- The lid/roof can be lifted as a single unit.
- (At least) one manufacturer available.



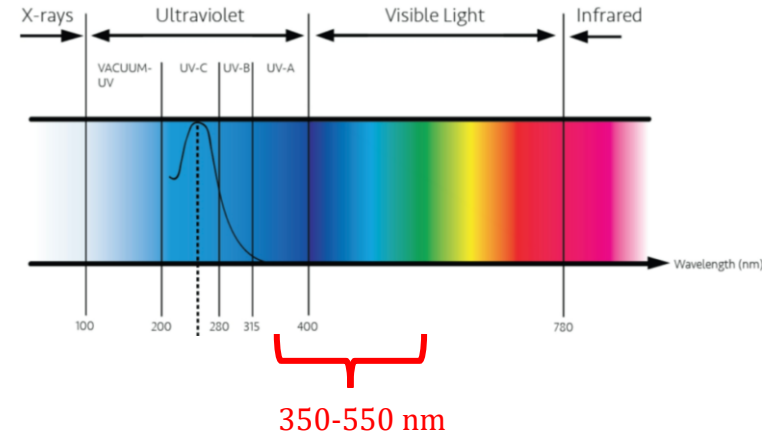
2.3 German model

- Been in use for some time; well tested and documented.
- Widely used in various countries and projects.
- Can be placed either hanging or on the ground.
 - Hanging often more practical on mountainous areas.
- Technical specifications of the trap openly available, as well as spare parts.
- Two manufacturers available, offering relatively similar traps.



2.4 Defining the light source

- In addition to UV light, lamp must include visible (blue/green) wavelengths.
- In the north, more luminous nights call for more power.
- In the south, less power is needed; light source can be optimized to ensure catches remain manageable.
- To minimize human disturbance, limit the use of yellow to red wavelengths.
- Also position the traps carefully, keeping them out of sight from passersby.

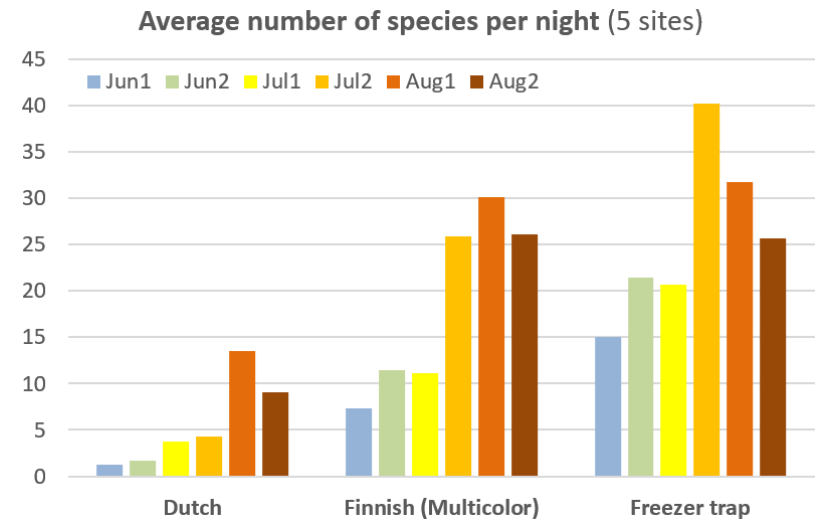
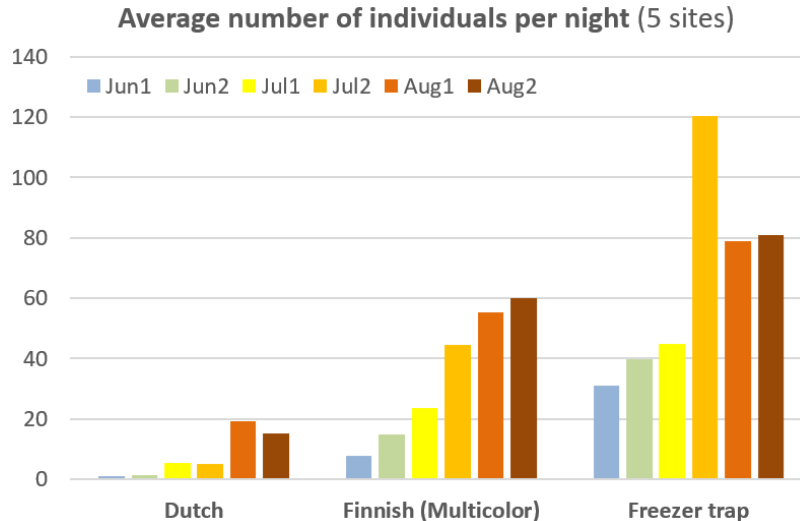


3. Experiences from this year's pilotings: Finland

- We compared **two** trap types, one of them with **two** light sources:
 - Dutch trap **4W** (390 nm, no roof) and Finnish trap **7W** (with roof).
 - Manufacturer provided the latter with two lamp options: Twincolor (365 & 395 nm) and Multicolor (365, 395 & 520 nm.)
 - These were compared also to our traditional, more effective freezer traps (with **125 W** mercury vapor lamp).
- Main results from these in the following slides.
- Got also plenty of user experience on both Dutch and Finnish traps.
- **Unfortunately**, we didn't realize in time that the Dutch and Twincolor lamp do not comply with DR... (lacking blue/green light)

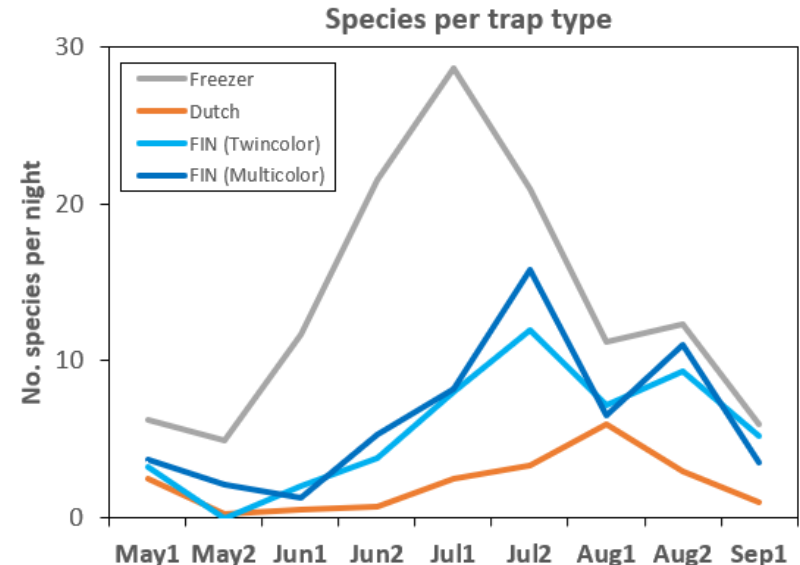
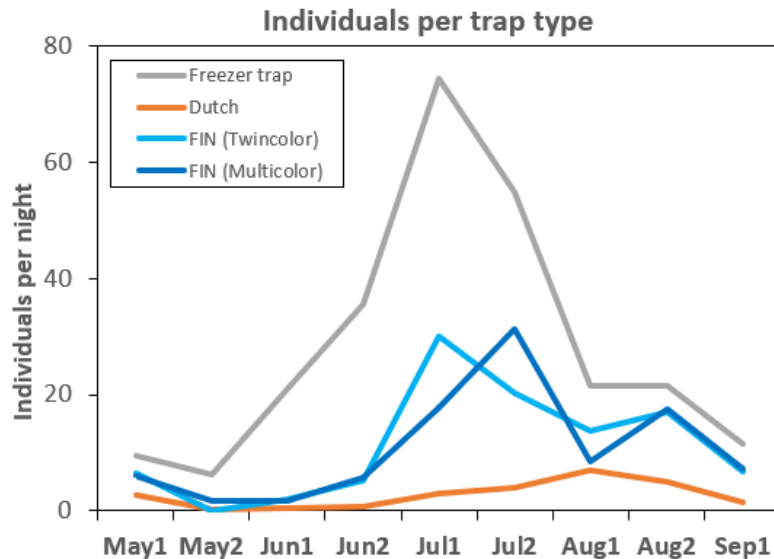
3.1 Comparison of Dutch and Finnish led traps

- Dutch trap (4W) produced very low catches, especially in early summer.
- Finland will use the national trap (7W), with catches not far from freezer trap.



3.2 Adding green light had little effect on catches

- Results from the two Finnish lamp types rather similar throughout the summer.
- Twincolor is less visible to human eye, but we'll need to use Multicolor.



3.3 Lessons learned in using Dutch/Finnish traps

- Both were technically reliable and easy to use.
- Big sizes make logistics a bit difficult – but both are light weight.
- On open habitat, strong winds may cause the trap to fall over.
 - Put it on solid base, preferably place e.g. a heavy stone inside
- Preferably don't move the trap at all while emptying it.
 - Even lifting the roof should be done gently, to avoid scaring the geometrids
- When the catch is large, handling the specimens can be tricky.
- In cool conditions, early emptying of the traps is not a priority.
- **BE CAREFUL** with the light source criteria – don't make our mistakes!

4. Arranging the moth monitoring in practice

- Following considerations are mainly for the national organisers.
- They are described in more detail in **EBOCC Technical Manual** (1.0; link provided in later slides)
- Each MS needs to plan their own training for the field workers.
- As a rule, each trap user should **first practice for at least 2-3 nights** e.g. on his/her own garden, to make sure everything goes smoothly.

4.1 Where can you buy / how to build led traps?

- Optional manufacturers are available in several countries.
- EBOCC can provide contacts for some of them – just ask us.
- Also building instructions are available, for some models.
- Please note, that delay from ordering to delivery is likely to be many months *>so hurry up, if the matter is still open!*
- To know how many traps you need, you'll first need to decide the general logistics of the monitoring.

4.2 Deciding the general logistics of the monitoring

- The primary decision to make in your MS:
 - Locate a pair of traps permanently on each monitoring site? **Or**
 - Require a smaller number of traps, circulated from site to site throughout the summer?
- The first option means acquiring a whole lot of traps (2x no. sites):
 - More costs for both purchasing and storage
 - May work, if sampling can be delegated to a larger number of people – e.g. public employees or citizen scientists – but this could lead to lower data quality
- The second option requires that sampling is done by professionals:
 - Lower material costs, but more travelling costs
 - Fewer people needed – thus more experienced (full-time) employees can be used.

4.3 Positioning the traps in field

- **Defined in DR:** minimum distance to artificial light & water bodies.
- Aerial photos and other maps help in pre-planning the trap positions.
- At next stage, contact the landowners and secure access to land.
- All localities should be checked and verified on field visits prior to monitoring season.
- Locations of the two traps should be representative of the monitoring site as a whole, especially regarding the ecosystem type coverage.
- Key criteria for placing the traps → see **EBOCC Technical Manual Table 2**



Available at CIRCABC:

https://circabc.europa.eu/ui/group/cb473742-9511-460d-8a21-ff0b44945d62/library/193fbe11-1279-45d3-8a1f-614354123966?p=1&n=10&sort=modified_DESC



Risk	Description	Mitigation
Human disturbance	- Higher risk in open habitats and close to roads, settlements and gardens. - May lead to unwanted manipulation of light traps.	Providing information, e.g. through mobile information boards.
Disturbance by livestock	- Particularly in grazed pastures, but can occur in many habitats, also through wild grazers. - Likely to be a major issue in regions with wide scale grazing (e.g. alpine areas, Mediterranean area). - May lead to light traps being damaged or toppled over.	Measures for keeping grazers at a distance (e.g. portable fences).
Disturbance by predators	Hornets can be a major nuisance at light traps.	When hornets regularly occur at a particular site, the nuisance can be reduced by switching the light on after (rather than during) dusk.
Exposure to wind	- Higher risk in completely open habitats. - May lead to the light trap falling over.	- Placing additional weight, e.g. large stones on the trap bottom. - Hanging traps and mounting them to the ground.
Exposure to morning sun and heat	- Higher risk in open habitats. - Particularly relevant in Mediterranean countries. - Increases activity of captured moths, leading to increased aberrations of wings and difficulty in handling of specimens once the trap is opened.	- Placing traps so that they do not receive direct morning sun. - Using portable mosquito nets or tents to avoid escaping specimens (i.e. both trap and surveyor should be positioned within the tent before opening the trap). - Using mobile coolers to decrease activity before opening the trap. - Using agents in traps (which is only recommended if intact samples cannot be secured in any other way).
Location in higher latitudes	Northernmost MS face summer nights that are never truly dark, reducing attractiveness of low-powered LED lamps.	- Placing the traps in shaded spots, e.g. small depressions or areas partly surrounded by nearby trees or bushes. - The DR allows the use of more efficient light sources (with higher power consumption) in latitudes higher than 60° N.
New vegetation growth	- Higher risk in densely vegetated habitats. - Can block light visibility and reduce the number of caught specimens.	- To ensure that 1 m radius around traps is free of obstructions (as stipulated by the DR), light traps should not be placed in thickets. - New growth of vegetation (in the height of the light source) may need to be removed from time to time. - In mature forests, placing traps on small clearings enables the light to spread more widely.

4.4 Environmental conditions suitable for data collection

- MS may define these according to their local circumstances, based on their expert knowledge.
 - For each parameter, define either a suitable range (min-max), or a single value (e.g. fog).
- At least **stormy and very rainy nights** would be reasonable to exclude.
- Minimum temperature may be recommended – and in the south, also maximum temperature may be considered.
- In the north, cold and cloudless nights should be avoided.
- Light rain often harmless, assuming your trap has a roof.
- Once set, the conditions should not be changed throughout the assessment period.

4.5 Recording of environmental parameters

- These are explicitly listed in DR – BUT they can be recorded in multiple ways, unless defined more accurately*.
 - **Temperature, Cloud cover, Wind speed:**
 - average, minimum, at midnight, or else? From a local data logger or modelled data?
 - **Fog, Precipitation:** 0/1 only?
 - **Moon phase:** can be validated explicitly for each night.
- Related to these, **start/end time of monitoring** includes options*:
 - **Dusk till dawn** covers all species flying throughout the night, and is constant throughout the years – **but** sampling time varies between both geographical latitudes and season...
 - **Fixed period** (e.g., 00-04 hours) produces comparable samples, and helps avoiding overly large samples – **but** may miss part of the species...

4.6 All decided methods and rules need to stay fixed

- Whatever decisions your MS makes on e.g. recording environmental parameters, start/end time of monitoring or any other methods, these **should not be changed** during the assessment period.
- The same applies for all the components in EU-PoMS.
- Therefore, **consider carefully** during the next months!
- Would be useful to ask comments on your plans from e.g. colleagues in neighbouring MSs.

4.7 Handling and photographing moth specimens 1

- Arrive as early as possible.
- Pause couple of meters before the trap to check for moths resting on its outer surfaces.
 - MS may decide whether these are recorded or not (ever).
- Trap needs to be opened very carefully, as especially geometrids are easily scared into flight.
- Noctuids usually remain dormant and manageable.
- Egg boxes or similar rough-surfaced materials ease handling the moths.



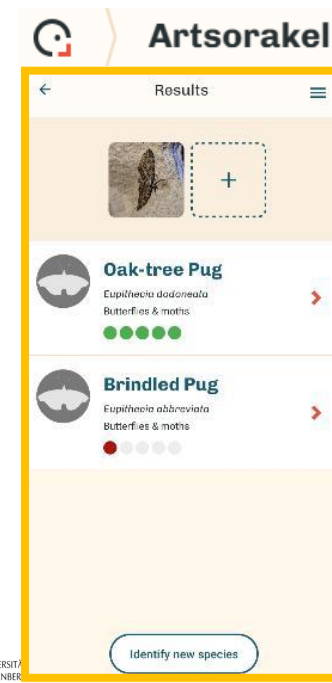
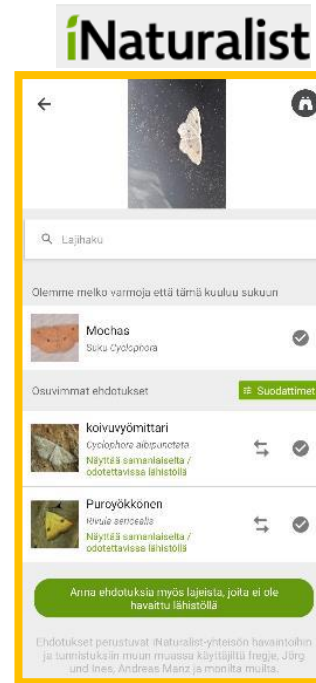
4.7 Handling and photographing moth specimens 2

- If a specimen cannot be reliably identified on site, it is recommended to photograph it for ex-situ identification (AI- or expert based).
- Photos taken for AI-based identification need to follow high quality standards:
 - Disturb the specimens as little as possible.
 - Geometrids should be photographed first, as they more easily fly off.
 - A good photo is taken from **directly above** the specimen.
 - Focus area should cover the **total wing area**.
 - Take several photos, if the specimen is not optimally placed.
 - E.g. worn out individuals may need to be taken as samples.
 - Only photograph dead specimens if you have an app that can reliably identify them – if not, they should be collected.



4.8 Several apps available for AI identification

- In addition to these, various others may also be found.
- If at least two apps support the same identification at high levels of confidence, it can be deemed reliable.
- Conflicting / uncertain cases need to be taken for expert check.



Future EBOCC products/events supporting EU-PoMS

- Practical guidelines for arranging the field work:
 - **Step-by-step Protocols For Surveyors** (follow-up on Technical Manual)
 - Also guiding **video materials** in preparation. Early November (TBC)
- **2nd Online Workshop:** Labelling and storage of specimens
 - Early November (TBC)
- **2nd Hands-on Workshop in Brussels**
 - 23-24 November
 - In person meeting – not possible to attend online
 - Invitations have been sent to all MSs. Registration: <https://ebocc.adelphi.de/>
 - Detailed programme will be provided later.

Availability of the recording and the PPT slides

- A separate recording of today's general part (slides) will be soon available at EBOCC web site:
 - www.syke.fi/en/projects/ebocc
- Today's PPT slides will also be uploaded to **CIRCABC**



Thank you for your attention!

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