Protocol Moth Monitoring SPRING (task 4.1)

Most of the moth species are attracted to light, therefore LEDtraps are a good option to monitor moths. These traps are already deployed in the Netherlands and Sweden. A great advantage over traditional traps is that they are portable, relatively cheap and switch on and off (simultaneously) with a light switch. This makes it a potentially very useful method to monitor changes in moth populations. However, we need more insight in the efficiency (and hence the number that needs to be deployed) of the traps in different habitats and biogeographical regions.

To establish the minimum number of traps required to reliably detect moth population trends, and the most efficient configuration we will run a series of pilots. The aim of these pilots is to:
1. establish a field protocol that describes how many sites are required to describe trends in moth populations through space and time.
2. validate this protocol on a pan European scale, and establish which resources are needed to operate the scheme on this scale.

We will test this method in Germany (Continental region), Hungary (Pannonic region), Sweden (Boreal region), Spain (Mediterranean region) and the Netherlands (Atlantic region).

Sites
Each of you have received 30 traps. Five of them are spare ones, the others can be used in five sets of five traps, each in a different habitat type. Choose habitats which you consider typical for your regions, e.g. a woodland, agriculture, semi-natural grassland, heathland, bog, etc.
The traps should be placed not too far apart in the same patch. A distance of around 100m seems large enough in open landscapes, in woodland it can be less (around 60m).
Each trap should be entered on the website https://butterfly-monitoring.net/my-moth-traps. Make an account and enter the types and locations of all traps.
After you have registered the traps, you will be able to enter data, either on the website or in the smartphone app ButterflyCount (available on Android and iphone).

Traps
For the installation and use of the traps you have received a manual as pdf. Once it has been updated with the part on entering the data we will make it available on the internet and provide you with a link.

Charging
The powerbanks normally last for two nights, but we would recommend to charge them before every count. As you will have to charge 25 powerbanks, it is good to have enough poweroutlets, and a set of some powerstrips can make your life easier. A powerport USB can be very usefull as well, but be aware of the minimum wattage (we use this one: https://www.bol.com/nl/nl/p/anker-powerport-6-eu-black/9200000047974968/).

Counts
Put the traps out during daytime (at least before it gets dark). The traps will switch on and off at dusk or dawn, so you don't have to stay near the traps. Leave a few egg-boxes in each trap, the moths will hide between them.

During our video-meeting it was suggested to make photos in all four wind-directions (N, S, E and W) on which the trap was included, as in https://ec.europa.eu/statistical-atlas/viewer/?config=LUCAS-2015.json. That way we can deduce vegetationstructure and -height from the photos.
At the moment it is not possible to upload these photos via website or app, but we will try to include this option. So good to make such photos and save them on your harddisk for the time being.

It is best to empty the traps as early as possible after sunrise. Once the sun shines on the traps, they warm up and the moths can get more and more active, making it difficult to identify and count them. Most moths are normally inside the trap, but sometimes there are moths sitting on the (white) trap. A favourite spot is directly under the edge of the bucket. Both the moths on the trap and the ones inside the trap will be counted separately. Only count the moths outside the trap which are still sitting on the trap. A moth counts as inside the trap when it went through the funnel.
There are several options to record the results, also depending on your preferences and your moth-id skills:

- If you are familiar with the species and can identify most of them directly at the trap, the easiest way is probably to enter the names directly in the ButterflyCount app. Alternatively you can write them down and enter them later at home or at the office, either in the app or via the website. Anyway it can be good to photograph some of the specimens, certainly if they are rare or unfamiliar species. Photos can be uploaded via the app directly (using data-connection or later via wifi) or via the website. So we can also build up a photo database which we can help to identify other photo's.

- If you cannot identify all the moths, it is best to make a photo of each individual. Try to get as close as possible, so the moth is as large as possible on the photo. Be sure that every single individual is only on one single photo. Photos can be uploaded via the app directly (using data-connection or later via wifi) or via the website. As soon as the photo arrives at the server, the moth will be identified by the Naturalis image recognition (partner of the SPRING project). Then automatically a list with speciesnames and counted moths will be generated. It is possible that the identifier cannot identify all moths, in that case these will be summarized under 'Moth unknown'. Of course you can change the name later yourself, either via the app of via the website. As the image recognition has been trained with data from NW Europe, it will probably work best in that region, and not so good in Hungary and Spain. However photos which are uploaded and identified, either by the recorder or by an expert, will be used to train the image recognition and that way improve future identifications.

Specimens which cannot be identified to species level can also be entered at genus-level. It is possible to enter micromoths as well, but this is an extra, as the main focus is on the macromoths. All records will end up in observation.org with the photo, and will be uploaded to GBIF by observation.org.

How many counts?
We aim at 24 visits: 12 a year. Most practical is to count every two weeks from April to September. Of course more counts are always permitted.
Next to that you can use the traps for inventories or research on the rest of the days. If you enter them as a single night (so not a standard point) then they will also contribute to the knowledge on the distribution and densities of moths in Europe. Photos will contribute to the AI making it easier for future work on moths to be done by relatively unexperienced recorders, thus spreading the use of moths for research and conservation.