



Monitoring pollinators: butterflies, hoverflies and bees

Lecturers/Organizers: Patrícia Garcia-Pereira (cE3c), Renata Santos (cE3c), Albano Soares (cE3c, Tagis)

Calendar: June 17th-21st 2024

Duration: 36 hours (contact hours)

Schedule: 10h00-13h00 and 14h30-17h30 Monday and Friday; 9h00-13h00 and 14h30-18h30 Tuesday to Thursday

Objectives

The decline of insects is a major concern all over the world as they are the main diversity component in any terrestrial ecosystem. In particular, the regression of pollinators' populations threatens the viability of plant communities in natural ecosystems, as well as sustainability of food production in crops and orchards. Measuring changes of abundance and population trends is a major goal of European environmental policies. Butterflies have been used as indicators of environmental change for a long time. Monitoring schemes based in butterfly counts by volunteers with standard methodology are running in several European countries: in the UK and Netherlands for decades and in Portugal since 2019. More recently, there have been made efforts to extend monitoring to other groups of pollinators, like hoverflies and bees. The SPRING project (Strengthening Pollinator Recovery through indicators and monitoring) established a standard methodology to achieve a broad pollinator monitoring: it joins butterflies, bees, and hoverflies counts with pan-traps along fixed transects. The main aim of this course is to train future volunteers to participate in EU Pollinator Monitoring Schemes in Portugal, following all the steps of SPRING methodology and increasing identification skills on butterflies, hoverflies and bees.

Learning outcomes and competences:

At the end of the course, participants should be capable of:

- Identifying insects to the taxonomic category of order;
- Dominate methodologies for counting butterflies, hoverflies and bees;
- Identifying at least 60 common butterflies;
- Recognizing the genus of hoverflies and bees and identifying common species.

Participants have to be present at 85% of the contact hours (this means that they can miss one half-day), and actively participate in all activities.

General plan

Each day will have a theoretical and practical component to train participants for monitoring pollinators following standard methodology. The transects and pan-trap will be established in FCUL campus. The samples will be sorted in the lab and the data will be introduced in online platforms.

Course contents:

1. Insects in Order

The course will start with a brief introduction to insects' diversity. The morphological characteristics, ecology and diversity of the main orders will be presented. The knowledge will be consolidated with the practice of the board game Insects in Order.

2. Identification of common butterflies

Butterflies are the best known and easiest group to identify. We will present the identification characters that allows the identification of approximately 60 common species in the country.

3. Identification of hoverflies

Hoverflies are a family of the order of Diptera with more than 200 species in Portugal. Most adults feed on flowers, while larval stages provide us with other ecological services, such as biological control and nutrient recycling. The common species are bee-like or wasp-like and all have the particular behavior of hovering in the air. Given the high diversity of the group, in this course we will start to recognize the family and identify the commonest species and genus.

4. Identification of bees

Bees have more than 700 species in Portugal. To count this difficult group, it is a good start to begin with bumblebees, and especially recognize without any doubt the honeybee. The other genus will be presented in comparison with honeybees, training the identification of common genus of the Apidae, Megachilidae, Halictidae, Andrenidae, Colletidae and Melittidae.

5. Application of monitoring methodologies

Throughout the course methodologies and proceedings recommended by the SPRING Project will be practiced. With transects and pan-traps installed in FCUL campus, students are going to practice the identification of butterflies, hoverflies and bees. In the lab, the pan-trap samples will be sorted and target groups identified at species level. The data will be inserted in the online platforms used in monitoring schemes.

This course can give credits to PhD programmes at FCUL or of programmes with partnership from FCUL and other institutions with 6h-7h of contact hours per ECT, as a function of specific requirements. **For these students additionally to the exercises done during the week the delivery of a written report done after the course is mandatory.** For programmes with less hours of contact per ECT (6h/ECT, getting 6 ECTs from the course) students need to do an additional assignment (summary report). If needed 1 or 2 additional hours of contact may be added. Such report(s) are also advised for other students requesting accreditation of the course in their institutions.

Nº (min, max) students: 10-25

Minimal formation of students: none, we require only curiosity about insects, pollinators in particular, and willingness to participate in biodiversity monitoring schemes

Directed to: for (but not limited to) PhD or Master students and Postdocs in any scientific area, as well as other professionals or volunteers interested in this topic

FEE

Free for 1st year PhD students in Doctoral programmes at FCUL (e.g. Biologia), Biodiversity, Genetics and Evolution (BIODIV UL; UP), Biology and Ecology of Global Changes (BEAG UL, UA) and Sustainability Science (UL, several institutions), when the course counts credits for their formation, in which case the delivery of a final report done after the course is mandatory; the course is also free for more advanced PhD students of the BIODIV programme (ULisboa or UPorto); 50 € for more advanced PhD students of cE3c of other programmes; 80 € for PhD students of the PEERS network (CFE); 125 € for FCUL Master students and unemployed; 180 € for BTI, BI and other PhD students; 250 € for Professional and postdocs.

When the maximum number of students is reached, 10 vacancies will be available for non-paying 1st year PhD students mentioned above, being, by order of preference students from: 1) cE3c; 2) BIODIV (not from cE3c); 3) FCUL (not from cE3c); 4) Sustainability Science (not from cE3c or FCUL); 5) BEAG (not from cE3c or FCUL).

Deadline for applications: May 24th 2024

How to apply

Candidates should fill in the following FORMULARY:

<http://inqueritos.ciencias.ulisboa.pt/index.php/336239?lang=pt>

This formulary is strictly confidential, as explained in the introduction, and the data are required because the cE3c Advanced Courses are also offered as part of the PRR programme of FCUL.

When filling the formulary mind to:

- 1) FILL ALL THE MANDATORY FIELDS
- 2) UPLOAD CV AND MOTIVATION LETTER, both mandatory; use the names as instructed there
- 3) If you want to resume later SAVE the formulary, otherwise you will need to fill everything again
- 4) At the end SUBMIT the formulary before exiting

For any doubts please contact the cE3c coordinator of the cE3c courses Margarida Matos, email mmmatos@fc.ul.pt and the teacher Patricia Garcia Pereira pnpereira@fc.ul.pt