



Botany in 21st century: integrating
modern molecular methods and
classical descriptive taxonomy



Botany in the 21st century: integrating modern molecular methods and classical descriptive taxonomy

Note: This course is presential

Lecturers/Organizers: Patrícia dos Santos (cE3c, SPBotânica), João Farminhão (SPBotânica), Miguel Porto (CIBIO, SPBotânica), Ana Júlia Pereira (cE3c, SPBotânica), Sara Lobo Dias (cE3c, SPBotânica), Ana Francisco (SPBotânica), Sergio Chozas (cE3c, SPBotânica), Adelaide Clemente (cE3c, SPBotânica)

Calendar: June 27th-July 1st 2022

Duration: 36 hours

Schedule: 5 days, 9:00-17:30

Specific needs: Access to a computer lab and to stereomicroscopes.

Overview: Phylogenetic studies have dramatically improved our knowledge of plant evolution in recent years. Since 1998 the Angiosperm Phylogeny Group (APG) has applied molecular techniques to create a stable and universal classification of angiosperms. Modern molecular studies are crucial to the understanding of the evolution and diversity of plants, however, classical taxonomy is still an essential tool for plant descriptions, classification and identification. This course presents practical methodologies for the identification and classification of plants based on the most recent phylogenies and the natural morphological characteristics of the main plant groups, integrating modern phylogenetics and classic taxonomical approaches. We will give an evolutionary overview of angiosperm diversification and of the evolution of important structures used for plant identification. The course integrates multidisciplinary approaches, connecting modern and classical methodologies as complementary, essential in several plant sciences (evolution, biogeography, morphological development, taxonomical classification, ecology, among others). The course targets examples from the Iberian flora, but the methods can be applied to any plant group worldwide. This course is directed

to anyone interested in evolution, taxonomy or any related field and recommended to anyone interested in plant sciences.

Objectives: This course aims to walk through the grounds of modern botany studies, covering subjects that have been excluded from most academic curricula. It will present the complete rationale for plant systematics studies, bridging classical taxonomy and modern molecular phylogenetic methodologies as complementary approaches. We will introduce the evolutionary and biogeographical contexts and the importance of herbarium collections for taxonomic revisions. The students will learn to identify the major angiosperm clades, with a practical focus on real case studies from the Iberian flora, historical and current classification systems, and how to use classical taxonomy as an essential tool in modern botanical studies.

Plan:

Theoretical topics

Principles of plant morphology and plant evolution

Flower evolution and Angiosperm diversification

Classification systems and APG (historical and current perspectives)

Introduction to modern methods on plant systematics

The reinvention of taxonomy (bridging classical and phylogenetic taxonomy)

Practical implications of unresolved taxonomies in ecology, biogeography and phylogenetic studies

The biogeographical history of the Iberian Peninsula (major events and origin of endemisms)

Plant radiations in the Iberian Peninsula

Practical classes

Practical classes will consist of exercises on the use of herbarium collections and fresh plant material in systematic studies, the use of phylogenetic trees and the application of taxonomic graphs to index biodiversity data, emphasizing the best current practices in botanical monography. Part of these classes will be held in the LISU Herbarium (MUNHAC).

This course can have a recognition of 6 ECTs for FCUL PhD students enrolling in it as part of their first doctoral year. These students need to deliver two reports after the course. For students only requiring 5 ECTs recognized in their specific PhD programmes the last 3.5 hours of the course are not mandatory, they need to deliver only the main report and the certificate will be on '**Topics in Botany of the 21st Century**'. **Such report(s) are also advised for other students requesting creditation of the course in their institutions.**

Nº (min, max) students: 10-20

Minimal formation of students: Bachelor degree (*Licenciatura*) in Biology, Environmental Sciences, Ecology or related areas. This course does not require previous experience.

Directed to: PhD or MSc students in Biology, Ecology or related areas, as well as postdocs, researchers and other professionals interested on the topic.

Fee: free for 1st year PhD students in Doctoral programmes at FCUL (e.g. Biologia), Biodiversity, Genetics and Evolution (BIODIV FCUL/FCUP), Biology and Ecology of Global Changes (BEAG UL/UA) and Sustainability Science (UL), 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 other PhD students from cE3c, 80 € for PhD students from institutions of the PEERS network (CFE-Coimbra); 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: 1) cE3c students; 2) BIODIV students (not from cE3c); 3) FCUL students (not from cE3c); 4) Sustainability Science (not from FCUL); 5) BEAG students (not from FCUL).

Deadline for applications: May 15th 2022

Candidates should send to Patricia dos Santos (papsantos@fc.ul.pt) a short CV and motivation letter explaining why they are interested in the course. The cv and letter should be named as 1st-lastNAME-CV.pdf and 1st-lastNAME-ML.pdf (that is personalize the name of each file with your first and last name).

In the email please add the following information:

Full Name:

E-mail:

Phone:

Professional activity: Professional/Postdoc, BTI, BI (or other non-post-doc research grant), PhD student (with/without scholarship), Lic. (Bachelor)/Master student

Academic formation:

PhD student of the 1st year of a Doctoral programme at FCUL (e.g. Biologia, Earth Systems), BIODIV (FCUL/FCUP), BEAG (FCUL or UA) or CCSDP?:

If yes to the above question, PhD student doing the Course to count credits for 1st year?:

PhD student of cE3c or CEF (Centro de Ecologia Funcional)?:

Name of the PhD programme: