



PhD candidate for FPI 2023 contract: Co-evolution and adaptive speciation of grasses and endophytes (*Festuca*, *Brachypodium*, *Epichloë*) in a pan-genomic framework

We are currently seeking an enthusiastic and motivated PhD student to join our Bioflora research group to work with us on co-evolution and adaptive speciation of pooid grasses and their fungal endophytes. We invite applications from ambitious candidates with relevant research experience and passion to conduct research and innovation activities on the framework of a project funded by the Spanish Ministry of Science and Innovation (PID2022-140074NB-I00).

The main objective of this research is to advance knowledge on the potential large extent of lateral gene transfer (LGT) in pooids and how this mechanism has contributed to generating evolutionary novelty, and on potential co-evolution of grass-*Epichloë* holobionts and how this phenomenon has additionally contributed to the success of adaptive speciation in the temperate grasses.

The specific objectives aim to (i) generate a large representative pan-genome and pan-transcriptome evolutionary framework of Pooideae for robust analysis of LGT events between phylogenetically distant lineages using newly sequenced genomes of Loliinae and *Brachypodium* species plus available genomes of other grass tribes, (ii) identify confident LGT events in Pooideae through comparative genome analyses using genome synteny, mapping, and coding-sequence scanning approaches, and phylogenetic filtering, (iii) analyze the level of expression of the laterally-transferred encoding genes in the recipient species and of the native genes, and identify the biological functions of the LGT genes that confer evolutionary novelty and putative enhanced adaptability, (iv) characterize the nature and abundance of transposon families across the analyzed genomes and lineages, and identify possible horizontal transposon transfer (HTT) linked to LGT and their potential effect on gene expression, and (v) search for potential horizontal gene transfer (HGT) events of fungal endophyte genes into the pooid genomes through comparative genomic analyses of grass genomes and newly generated and available *Epichloë* genomes and evaluate the expression levels of foreign genes and the potential evolutionary adaptive advantages conferred to the plant.

PhD characteristics:

- Cotutored PhD thesis. Supervisor/s: Prof. Pilar Catalan (University of Zaragoza) and Prof. Jianquan Liu (Lanzhou University)
- Job location: High Polytechnic School of Huesca, University of Zaragoza, Huesca (Spain)
- Full-time position (37.5 h/week)
- Terms of appointment: The duration of the PhD candidate contract will be for four years.
- Salary: The financial remuneration will be of € 1,470.97 gross per month (12 payments) (€ 17,651.68/gross per annum) for the first and second years, € 1,576.04 gross per month (12 payments) (€ 18,912.51/gross per annum) for the third year, and € 1,970.05 gross per month (12 payments) (€ 23,640.64/gross per annum) for the fourth year, which will be subject to the corresponding withholdings, pursuant to prevailing regulations, and to the collective employment agreement of the University of Zaragoza.
- The University of Zaragoza will also pay the annual fees of the doctoral school when receiving the enrolment.
- Employee Benefits: 22 vacation days, 3 days of family & work conciliation, 45h of personal days, Compressed Summer schedule from 15/July to 31/August, Conciliation schedule.

Tasks and responsibilities:

The ones corresponding to a PhD student. The selected candidate will be enrolled at the PhD program of Agricultural and Environmental Sciences in the University of Zaragoza and will need to fulfil the academic requirements of the PhD program.

The specific tasks include:

- Perform literature review, field, garden and growth chamber work, laboratory analyses, and data collection and management.
- Perform genomic assembly and annotations, comparative genomics, phylogenomics and population genomics.
- Write Scientific articles
- Contribute to the teamwork and team-spirit in the research line.

Required qualifications and experience:

Candidates must hold one of the following

- BSc degree: Biological Sciences, Agronomy, Biotechnology or similar.
- Master degree: Plant genetics, Evolution, Biodiversity, Plant breeding or similar

Candidates must be in a position to access a doctoral program according to the requirements of Spanish universities (accrediting between 60 and 120 ECTS credits at an official university master's degree level or equivalent).

Candidates should not have a previous PhD degree.

Desirable requirements:

- Proficiency in English
- Analytical and organizational capacities
- Good communication skills
- Ability to work as part of a team
- Driver license

Application process:

If you wish to be considered for this position, please, send an email message to Prof. Pilar Catalan (pcatalan@unizar.es) to the job post with reference FPI-PID2022-140074NB-I00 and upload your CV and motivation letter. All information will be treated in the strictest confidence.