

Expert-Net Project

Two PhD Positions

We are recruiting two PhD students to join our project Expert-Net, beginning at March-2022. The students will enroll in the joint Doctorate program of "Management of Natural Resources" at Universidad de Cuenca and Universidad del Azuay, in Cuenca, Ecuador. The project Expert-Net is a Swiss-Ecuadorian project that will develop knowledge on pollination interactions, animal and plant ecology for restoration of tropical biodiversity, and is funded by the Swiss National Science Foundation, Spirit Program.

Overview of the project

Knowledge of the effects of climate and land-use change on species richness, composition and interactions, and in turn, ecosystem services largely comes from observational studies. This makes restoration difficult because mechanisms underlying patterns in observational studies are often hard to uncover without well-conceived experiments. Unfortunately, such experiments are still quite limited, especially in restoration and network ecology. Our goals are to: (WP1) evaluate how experimental removal of key plant species influences plant-hummingbird interaction networks, with a focus on rewiring (changes in partner use); (WP2) evaluate plant fitness in the context of our removal experiments; (WP3) evaluate current distribution of key plant species in restoration areas and experimentally determine abiotic requirements for germination and establishment of key plant species for restoration; and finally, (WP4) combine these results to model restoration scenarios that might promote plant, hummingbird and interaction diversity. Addressing these aims will (i) fill persistent empirical gaps and evaluate common assumptions in network and regeneration ecology using experimentation; (ii) develop theory on the influence of species extinctions on species diversity and ecosystem processes; and (iii) inform the design of future landscapes aimed at maintaining species and interaction diversity and ecosystem function.

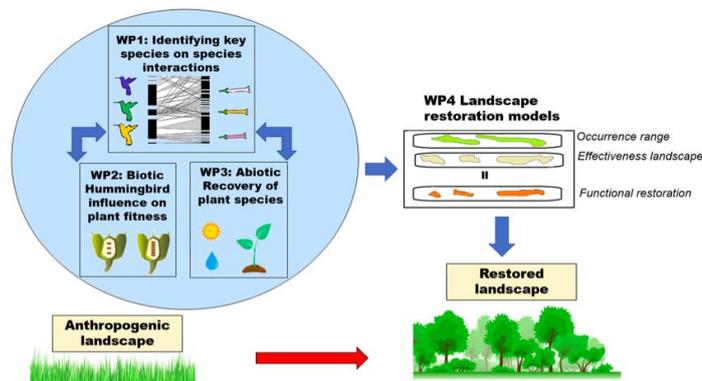


Figure 1. Transforming an anthropogenic landscape into one where biodiversity and ecosystem processes are maintained (restored landscape) required detailed ecological knowledge. In the case of plant and hummingbird interactions and the pollination ecosystem service this requires: identification of key plant species for hummingbirds (WP1), quantification of biotic and abiotic factors influencing reproduction and establishment of these key species (WP2,3) and models that apply this ecological knowledge to develop landscape restoration scenarios.

Mid- to high elevation tropical mountains are excellent natural laboratories for integrating species interactions into restoration ecology. Environmental conditions vary considerably and across short distances making it theoretically interesting and logistically feasible to explore the role of key plant species in restoration. Such ecosystems are heavily used by humans, integral to human well-being (e.g., as watersheds) and susceptible to global climate change. Hummingbird-plant interactions, in particular, are a useful study system because of the tight mutualistic relationship between hummingbirds and plants and the importance of hummingbird pollination for ecosystem functioning.

Tasks for the students

Student 1 will experimentally evaluate the role of key plant species in animal-plant interaction networks by implementing flower exclusion experiments. The student will use a series of analytical tools to measure the responses of hummingbird biodiversity and network structure to the exclusion of key species. This is WP1 (see Figure Above)

Student 2 will evaluate the recovery of key plants for hummingbirds in natural forests and forest restoration sites under different environmental conditions. The student will establish permanent plots mainly in Azuay. This is WP3 (see Figure Above)

Profiles

- **Student 1.** Masters degree in Ecology or related field; **Student 2** Masters degree in Ecology, Agricultural Sciences, or related field.
- Good English level. Level B2
- Experience developing research

What are we offering?

- Opportunity to join an international research team that includes principal investigators, post-docs, PhD students, Master students and undergraduates.
- All the expenses for the research will be funded.
- Two research stays, for a total of 10 months, at the Swiss Federal research Institute (WSL), located in Zurich, Switzerland.
- Stipend during four years (1385 Swiss Francs)

Other Useful Information

- Students will have a 40 % discount in tuition fees
- The studies will be conducted mainly in Azuay province, in montane ecosystems
- **Student 1** will be based at Universidad del Azuay, and will be supervised by Boris Tinoco PhD (Research Gate: profile: <https://www.researchgate.net/profile/Boris-Tinoco>).
- **Student 2** will be based at Universidad de Cuenca, and will be supervised by Ximena Palomeque PhD – Universidad del Cuenca (Researchgate profile: <https://www.researchgate.net/profile/Ximena-Palomeque>) and Selene Báez PhD – Escuela Politécnica Nacional (Research Gate profile: <https://www.researchgate.net/profile/Selene-Baez>).
- Catherine Graham PhD from the Swiss Federal Research Institute will co –supervise all the students (<https://www.wsl.ch/de/mitarbeitende/graham.html>).
- The call will be open until December 31 2021.
- Selection process will start in January 2022.
- Expected start of the PhD program is March 2022.

Application process:

Interested students please fill the following form:

<https://forms.gle/4s8wh3H8PivtuzY57>

Selected students will face a round of interviews.

More information about the Doctorate program in Natural Resource Management can be found here: <https://www.ucuenca.edu.ec/doctorado-rnr/>

For more inquiries about the project write to Boris tinoco at btinoco@uazuay.edu.ec or Ximena Palomeque at ximena.palomeque@ucuenca.edu.ec