Instituto de Biología
Universidad Nacional Autónoma de México

DEPARTAMENTO DE BOTÁNICA
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IAPT Research Grants Program 2020

To whom it may concern:

I am very pleased to provide a letter of support for Andrea López Martínez application for an IAPT Research Grant. Andrea is a 2nd year PhD student at the Graduate Program in Biological Sciences at the National University of Mexico (UNAM), and I am her main advisor. Andrea obtained her M.Sc. degree in the same Graduate Program, working under my supervision.

Andrea´s research revolves on the morphological evolution of flowers, for which she integrates morphological data of extant and fossil species into dating analyses and formal analyses of morphological evolution. During her MSc, she investigated the evolution of the floral groundplan of Pentapetalae – a large clade within the angiosperms – in a total evidence context, in which she scored morphological characters for the complete set of sampled taxa, which included extant and fossil flowers. One of the main (and unexpected) results of her work is that the pentamerous meristic pattern that characterizes Pentapetalae was reconstructed as evolving outside Pentapetalae when fossils were included in ancestral state reconstructions. Andrea presented the results of her work as a poster at the Joint Congress in Evolutionary Biology in Montpellier in 2018, and in the Botany 2019 Conference in Tucson, AZ, in 2019, and is now preparing a manuscript describing her research. During her MSc, Andrea acquired a deep understanding of floral morphology, and developed skills in phylogenetic comparative methods to address questions on macroevolution, including relaxed clock dating, and ancestral state reconstruction.

The experience that Andrea acquired during her MSc represented a substantial asset when she proposed a highly ambitious PhD project, involving investigation of floral morphological evolution across angiosperms, including extant and fossil species. This study is based on a large but critically chosen set of 1209 extant species belonging to all (100%) of angiosperm families, including a representation of the crown node of all non-monotypic families. This part of the project involves conducting dating analyses as part of a collaborative effort in my working group, which has been submitted for publication. In parallel, a research collaborative team involving Dr. Hervé Sauquet (Royal Botanic Garden, Sydney), Jürg Schönenberger (University of Vienna) and myself have been working on obtaining a morphological database of floral characters for the 1209 extant species in the dated tree. While this task seems enormous, we have achieved substantial advance through work at our labs, and through scoring sessions at the eFLOWER Summer School in Oak Spring Garden, in 2018 (http://eflower.myspecies.info/oakspringsummerschool). When Andrea stared her PhD project,

approximately 2/3 of the scoring for extant species had been completed. Since she started her PhD studies, Andrea has contributed a substantial amount of morphological data to the project, so much that at the moment, only fewer than 50 extant spp. (of the original 1209) remain to be scored. Nevertheless, many of the already scored species require careful corroboration and revision. Andrea has also put substantial effort in reviewing the angiosperm fossil record, and identifying a set of ca. 150 fossil flowers that will be scored for morphological characters. She has made progress in scoring morphological characters for the fossil species.

The funding that Andrea requests will be used to attend the eFLOWER Down Under Summer School in the Botanical Garden, Sydney, in April 2020 (http://eflower.myspecies.info/eflowerdownunder), which will be hosted by our collaborator, Dr. Hervé Sauquet, and to remain in Dr. Sauquet´s lab for a two-month research visit. During the Down Under Summer School, and given her experience scoring characters and conducting comparative analyses, Andrea will mentor students, and will also give a lecture. Importantly, Andrea will coordinate the effort to finalize scoring morphological characters for the extant data set.

After the Summer School, Andrea will remain in Dr. Sauquet´s lab, where she will work on dataset curation and cleanup, following protocols put in place for previous datasets published by our group (Sauquet et al. 2017. DOI: 10.1038/ncomms16047 |www.nature.com/naturecommunications), and set-up preliminary tip-dating analyses.

Andrea´s attendance to the eFLOWER Down Under Summer School, and subsequent research visit to Dr. Sauquet´s lab, will be critical for the development of her PhD project. It will allow her to interact directly with the main eFLOWER coordinators simultaneously during the Summer School, and to expand her network and meet more researchers and students in botany and evolutionary biology from the RBG Sydney and nearby universities.

I am very grateful for your consideration of Andrea´s application.

Sincerely,

Susana Magallón, PhD
Senior Research Scientist
Institute of Biology
Universidad Nacional Autónoma de México