

Project Title: Phytogeography of Ancient Plant Lineages in Madagascar: Part II.

Scope of the Project:

Students were selected to construct and analyze phytogeographic data of ancient plant lineages in Madagascar. This study is part of a larger project intending to bridge the gap between our knowledge of the plant fossil record and the development of Madagascar's current floral diversity. Research focused on selecting fern and angiosperm taxa at the root of their respective lineages as supported by molecular phylogenies. The current distributions of these taxa in Madagascar, Africa, India, Australia, Indo-Malaysia (and in some cases South America) were used in biogeographic analyses. Each student selected a particular plant family (or part of a family) to examine distributions at the genus or species level in our regions of interest, and then developed hypotheses and analyzed data for their individual projects, which were related to the main research objectives.

Timeline:

*June 16-August 11, 2008:* I mentored seven dual-enrollment students (see below) for several hours over the span of these 9 weeks. We met as a group each week, and furthermore we (I and/or my assistant Rebecca Moshman) met with each student separately each week to help them with their individual projects. At the group meetings, we discussed readings in the biogeography book: "Song of the Dodo" by David Quammen, and I also went over the methodology and other information about analyzing their data that was applicable to all the projects.

Participating Students and Contributions:

All students had individual projects that were related to the main research objectives. On August 11, each student presented their completed project and results in an oral presentation (all .ppt files are available; see following photos).

Jing Chen (junior; Millard North): Jing selected the fern family Schizaeaceae (order Schizaeales; including the monophyletic clades sometimes separated into Lygodiaceae and Anemiaceae *sensu lato*).

Ryan Corrigan (junior; Millard North): Ryan examined the angiosperm family Annonaceae (order Magnoliales). Since it is a diverse family with hundreds of species, he narrowed his focus to genera that were present in Madagascar and then compared those to the other regions.

Courtney Devney (junior; Millard North): Courtney selected the fern family Pteridaceae (including Adiantaceae and Vittariaceae *sensu lato*), and ended up analyzing data at the genus level because some clades were speciose and endemic.

Natalie Gorup (junior; Duchesne Academy): Natalie chose the angiosperm family Lauraceae (order Laurales). Some genera are very speciose in this family, so we narrowed her focus to the phylogenetically basal clade of the group.

Rebecca Harrison (sophomore, Central): Rebecca examined the angiosperm family Myristaceae (order Magnoliales), and also included examining genera in South America.

Anne James (senior; Bellevue West): Anne selected the small angiosperm family Hernandiaceae (order Laurales).

Pethum Rajapakse (senior; Millard West): Pethum chose the angiosperm family Monimiaceae (order Laurales).

Future Plans, Dissemination and Research:

I have plans to continue the main project with students in the future. Student feedback and success with obtaining results was very positive. Students in this project indicated that they planned to continue with their interest in STEM areas as a STEM major in college. With regard to overall project results, all students found unique and sometimes surprising results within their families. It will be crucial in the future to obtain additional data from India and include South America, especially for widespread genera. A future poster and/or paper will be submitted to an upcoming conference. This is part of a long-term project to link plant fossil data in Madagascar with its modern plant composition. With additional research, future manuscripts are planned.



From L to R: Dr. Boucher, Ryan Corrigan, Anne James, Natalie Gorup, Jing Chen, Rebecca Harrison, Courtney Devney, and Pethum Rajapakse

