Reconstructing the Evolutionary History of Reproductive Characters in *Anthurium* (Araceae)

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Anthurium (Araceae) is a large Neotropical genus with ca. 1,000 accepted species exhibiting great variation in morphological traits. Former classifications have been based mainly on its variable vegetative morphology, but they were not supported by subsequent molecular analyses. The evolutionary history of a plant group is best understood by looking at the reproductive morphology of that group, as opposed to the vegetative morphology, since changes in the former bring about speciation more frequently than changes in the latter. The purpose of this study is to characterize the reproductive morphology of 17 sub-generic clades identified by Carlsen & Croat (2013), and to evaluate the evolutionary importance of reproductive changes in *Anthurium*. To survey the reproductive morphology, ninety-eight *Anthurium* species were sampled for 32 reproductive characters (18 of inflorescences, 8 of flowers, and 6 of berries), 14 of them quantitative and 18 qualitative. Measurements were taken from MO herbarium specimens under a dissecting microscope, and entered into a modified LUCID Key. To survey the pollen morphology, sixty *Anthurium* species were sampled for 15 pollen characters, 5 of them quantitative and 10 qualitative. Pollen was collected from MO herbarium specimens or inflorescences preserved in FAA, and then critical-point dried, sputter-coated, and observed with a JCM 5000 Neoscope set to 10 kV. In the data analysis, the character states of the reproductive and pollen characters were mapped onto the molecular phylogeny using the Trace Character History function under Maximum Parsimony in Mesquite. As a result, fifty-eight synapomorphies were identified for the 17 clades proposed by Carlsen & Croat (2013); one to nine synapomorphies were identified for each clade. Twenty-nine characters (out of 47 total) led to the identification of synapomorphic states. All six fruit characters yielded synapomorphies, but only 12 out of 18 (67%) inflorescence characters, 5 out of 8 (63%) flower characters, and 6 out of 15 (40%) pollen characters were associated with synapomorphies. In particular, berry color, spadix color, peduncle/petiole length ratio, and berry width were the most important characters that defined clades; four or more synapomorphic states were found for each. Given that all of the clades from Carlsen & Croat (2013) could be identified with reproductive character shifts, we conclude that reproductive changes have played a major role in the diversification of *Anthurium*. In the future, more species should be examined, since in this study, we sampled the reproductive characters of only about 10% of *Anthurium* species. A larger sampling size will help in the characterization of clades smaller than the ones included in this study. Also, in future studies, some character states may need to be redefined, since several of the ones currently in use (such as red and purple spadix color) are somewhat arbitrary, and should be merged into one character state. Finally, studies on pollination and fruit dispersal may help us identify what types of ecological interactions caused the reproductive character shifts we identified.