



# Smithsonian Tropical Research Institute

Apartado 0843-03092, Balboa, Ancón  
Panama City, Republic of Panamá  
Fax +507 212-8148

**Yves Basset, PhD**  
Ph +507 212 8233  
E-mail: [bassety@si.edu](mailto:bassety@si.edu)

6 December 2019

Re: Supervisor's Thesis evaluation for Chris Nazipa Dahl

## **Chris Nazipa Dahl: A cross-continental comparison of fruit-and seed-feeding insects in the rainforests of Panama, Thailand and Papua New Guinea**

Chris Dahl's PhD thesis discusses the differences in assemblages of insects feeding on seeds and fruits at three tropical rainforests, in Panama, Thailand and Papua New Guinea. The thesis represents a wealth of information on these assemblages, which are extremely poorly known. Before the completion of Chris' thesis only a handful of similar studies were performed in the tropics, and none at different sites with the same standardized methods. The achievement of Chris' thesis is therefore highly laudable just on this specific issue. Chris skillfully implemented standardized field protocols with impressive sampling effort at three very disparate tropical locations, emphasizing his sense of organization and adaptability, which are essential qualities for a scientist. But the significance of Chris' thesis goes well beyond these considerations. The "Janzen-Connell hypothesis" represents a topic of utmost importance for tropical ecologists, potentially explaining the coexistence of myriads of trees species in rainforests. The hypothesis continues to generate substantial literature (1,340 hits on Google Scholar). As a recurrent theme in the thesis chapters, armed with solid insect data, Chris had, for the first time, the opportunity to discuss the relative importance of the Janzen-Connell hypothesis as seen with the eyes of an entomologist at different tropical sites. Chris emphasizes the action of seed predators as potential agents reducing plant fitness in tropical rainforests. However, he concludes that the magnitude of these effects may vary among sites, with interesting ecological implications for forest regeneration and the local maintenance of tree diversity.

Insects preying on seeds and fruits are rather small and their taxonomy is, to say the least, demanding. Chris overcame competently these challenge by, for the first time in studies of tropical seed predators, using DNA barcoding, in which he is now proficient. The other merits of the thesis are multiple, but one can emphasize the use of phylogenetic analyses to disentangle the relative importance of phylogenetic and ecological variable to explain the characteristics of insect assemblages. This is particularly commendable because of the high plant richness in Chris' study system (near 1,200 plant species), and the concomitant expertise needed to recognize both the plants and associated insects. Chris also nicely coined different analyses to contrast the interaction networks between plants and insects at his three study sites.

Chris is the lead author of two thesis chapters and a significant co-author for two other chapters. This reflects the collaborative nature of such a large research program, and the range of expertise needed to summarize adequately the results. In the first chapter, Chris proposes a new classification of fruit syndromes from an entomocentric viewpoint. This will certainly attract the attention of zoologist and botanist colleagues, as rates of seed attack by insects may be more easily explained with the new classification. In the second chapter Chris and colleagues discuss the salient differences between insect assemblages at the three study sites and note that the drier site in Panama appears to be rather distinctive from the other sites studied. In the third chapter, Chris, for the first time in studies of tropical seed predators, examines the effects of seasonality on the interactions between insects and plants. He concludes that seed predation rate is more

intense during the wet season with, again, possible interesting ecological implications. In the final chapter, Chris and colleagues discuss more specifically the results of insect rearing obtained at the Thai site of Khao Chong, part of the ForestGEO network of forest dynamics plots. They show that low insect densities and diversity prevent the occurrence of major seed pests in this forest.

To my opinion, Chris' thesis is sound, rigorous and of high intellectual merit, and this is reflected in three of the four chapters being already published in international journals. Despite sometimes difficult familial situations, Chris has demonstrated, during his tenure as PhD student in Ceske Budejovice and in the field at his three tropical sites, the essential qualities of a scientist orientated towards field experiments. To cite a few: high curiosity, attention to details, interest in new analytical methods, ability to summarize effectively substantial data sets, and willingness to endure sometimes difficult conditions in the field.

Chris Dahl is an accomplished scientist who is a renowned expert in the ecology and taxonomy of Papuan frogs. With this admirable thesis Chris also proves that he is now an expert in tropical insect seed predators. I am not sure where his future scientific career will lead him, but my secret hope is that he keeps a foot in tropical entomology. Whatever he will choose, I wish him the very best in his future scientific career.



Yves Basset  
PhD Supervisor  
ForestGEO Entomologist  
Senior Editor, *Insect Conservation and Diversity*