

Science and Technology Group Annual Report FY2018

Juanita Choo
Science and Technology Associate

1 Introduction

I returned from leave in September 2018. My research focuses on understanding how human activities (both within traditional and industrialized societies) impact forest communities. I use a combination of field data, molecular, and spatial methods to evaluate how human activities impact plant-plant and plant-animal interactions and the consequences for forest regeneration and biodiversity. I also study how human activities can potentially impact essential ecosystem services that insects/animals provide including seed dispersal and nutrient cycling. My research has largely been conducted in the Peruvian and Venezuela forests, in collaboration with researchers at the San Diego Zoo, Tulane and Rice University. More recently, I have initiated a study to assess human disturbance on insect diets and their bacterial symbionts within the OKEON (Okinawa Environmental Observatory Network) sites in collaboration with the Economo Unit.

2 Activities and Findings

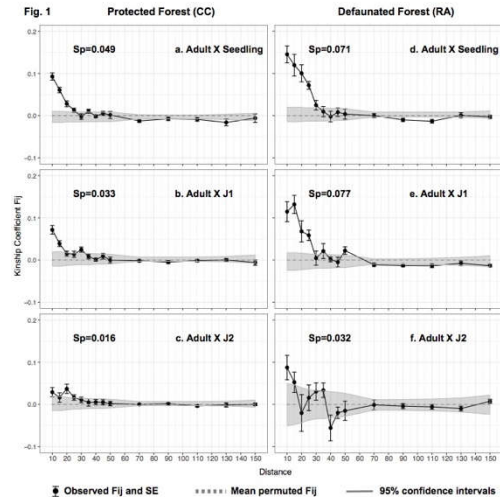
2.1 Multispecies comparison of hunting impacts on the dispersal and genetic structure of forest plants in the Peruvian Amazon

Background: Many tropical forests world-wide currently face severe hunting pressures and the loss of seed dispersal services that hunted mammal seed dispersers provide. Seed dispersal play a central role in the patterns of recruitment and plant distribution across landscapes and influences local and regional interactions including competition and interactions with pests and pathogens. Hunting and seed dispersal loss may have long term consequences for the composition of tropical forest tree communities, as well as their population genetics. The goal of our study is to examine the impacts of hunting and defaunation on seed dispersal and the genetics of tropical plant species through a multi-species comparison in protected and defaunated forests in the Peruvian Amazon. Our research focuses on three hunting impacted trees– *Attalea phalerata*, *Pseudomalmea diclina*, and *Guararibea witi*. All species are primarily dispersed by commonly hunted mammals in the region including primates, agouti, and pacas.

Science and Technology Group Annual Report FY2018

Juanita Choo
Science and Technology Associate

Progress: In FY2018, we completed mapping out all the locations for *A. phalerata* in a 150 x 150 m study plot. We also sampled leaf tissues from every individual to assess their genetic identities. This will allow us to assess how far plants dispersed at the defaunated forest compared to the protected forest, as well as to compare overall population genetic structure of *A. phalerata* in these two forests. We expect to complete the genetic analyses for *A. phalerata* by the December of 2019. Data collection and genetic analyses for *P. diclina* and *G. wittii* will commence in FY2019. Preliminary results from our genetic work indicate decreased dispersal and stronger spatial genetic structure for *A. phalerata* at the defaunated site (Fig 1).



2.2 Impacts of an indigenous settlement on the taxonomic and functional structure of dung beetle communities in the Venezuelan Amazon

Background: Traditionally nomadic indigenous communities in Amazonia have increasingly adopted more sedentary lifestyles as a result of external influences. Permanent settlements lead to the concentration of disturbances (e.g., forest extraction and hunting) and threaten vulnerable species as well as those that provide important ecosystem services such as dung beetles. In study, my collaborators and I evaluated the abundance, taxonomic, and functional structure (functional trait and diversity) of an ecological indicator group—dung beetles— along a disturbance gradient associated with a permanent settlement of the Jotí people in the Amazonian region of Venezuela. The goal of this study was to assess the response of dung beetle abundance and functional structure to human disturbance associated with the Jotí settlement.

Progress: We have completed our study and have submitted our manuscript to the journal Biodiversity and Conservation. It is currently under revision.

3 Collaborations

Economo Unit, OIST
Varun Swamy, San Diego Zoo
Jordan Karubian – Tulane University
Therese Lamberty, Amy Dunham, Rice University
Eglee Zent, Instituto Venezolano de Investigaciones Cientificas
Bruce D. Gill, Canadian National Collection of Insects, Arachnids and Nematodes
Alain Zuur, Highland Statistics Ltd

4 Publications and other output

No applicable