

Science and Technology Group Annual Report FY2021

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1 Introduction

I apply a combination of field data, molecular, and spatial analyses to evaluate how human activities impact plant-plant and plant-animal interactions. My collaborators and I are using a multi-species comparison to study how hunting and the loss of seed dispersal services from hunted mammals could influence gene dispersal and the spatial genetic structure of tropical tree species in the Peruvian Amazon [see 2.1]. In Okinawa, we are collaborating with the Economo Unit and OKEON, to apply metabarcoding methods to assess how trophic interactions in forest communities maybe differ between disturbed and protected forests and whether these interactions changes following severe climate events such as typhoons [see 2.2].

2 Activities and Findings

FY2021 marks the second year of COVID for the world. I would like to acknowledge the hard work of all my collaborators and OIST support staff, who did their best to continue with work and data collection despite the unending disruptions at work and home.

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

In FY2021, fieldwork was carried out at two sites in the Peruvian Amazon Forest. One site is a protected forest site (Cocha Cashu) where hunting is not permitted, and another site is a forest where hunting is permitted (Reserva Amazonica). At each site, we mapped and measured trees >1cm dbh for three species *Pseudomalmea diclina*, *Guararibea witii*, *Sorocea pileata*. Leaf samples from each individual tree was also collected and dried for genetic analyses. We collected data and samples from about 2200 trees.

We also commenced the molecular work to genotype the population of trees in our study. Our goal is to identify SNP markers that will allow us to genotype the tree individuals for parentage and population genetic analyses to address questions relating to hunting impacts on plant population genetics. Leaf samples from the Cocha Cashu site were extracted for DNA and sequenced on NovaSeq using radseq protocols. The bioinformatics analyses to process the data from the Cocha Cashu site is currently underway. The molecular work for sequencing the trees from the Reserva Amazonica site will commence and expect to be completed in FY2022.

2.2 A landscape-scale study of interaction networks along disturbance gradients in Okinawa

In collaboration with OKEON field support team, we continue this fiscal year with the collection of biodiversity forest tree data at and additional 8 OKEON sites (7 sites were completed the last fiscal year). For this field season, we completed the mapping, measuring, and identification of approximately 1000 tree individuals > 1cm dbh. Like last year's field sites, our preliminary analyses indicate higher plant biodiversity at less disturbed site. There were also changes in the dominant plant species associated with each site.



The goal is to complete the plant biodiversity data collection at another 7 sites (permits allowing) by FY2023. The completion of the forest tree biodiversity data collection at these 21 sites will provide information on tree biodiversity across the OKEON sites to test the hypothesis of how

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trophic interactions in forest communities maybe differ between disturbed and protected forests. The tree data will moreover provide a useful biodiversity metric for other researchers working on a variety of ecological questions at the OKEON sites.

3 Collaborations

Evan Economo, OIST
OIST OKEON
Varun Swamy, San Diego Zoo
Susan Kennedy, Trier University

4 Publications and other output

Author list, *Title*, Journal or other reference, volume information (year)