

A scenic view of a mountain range with lush green forests and a traditional Chinese pavilion on a cliffside. The pavilion is red with a black roof and is situated on a rocky outcrop. The background shows misty, rolling hills under a hazy sky.

Phylogenetic and Ecological Diversity Across
an Ancient Floristic Disjunction
An NSF Dimensions of Biodiversity Project

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University of Florida

US-China Collaboration: Team Members

- Pam Soltis
 - Phylogenetics
- Doug Soltis
 - Phylogenetics
- Jeremy Lichstein
 - Ecology, Modeling
- Eric Triplett
 - Nitrogen Fixation, Microbiology
- Matt Gitzendanner
 - Phylogenetics, Computational Biology
- Stephanie Bohlman
 - Ecology, Remote Sensing



US-China Collaboration: Team Members

- Jack Gilbert
 - Microbiology, University of Chicago/Argonne National Lab
- Michelle Mack
 - Ecology, Northern Arizona University
- Jenny Xiang
 - Systematics, North Carolina State University
- Wei Shi
 - Soil Science & Ecology, North Carolina State University

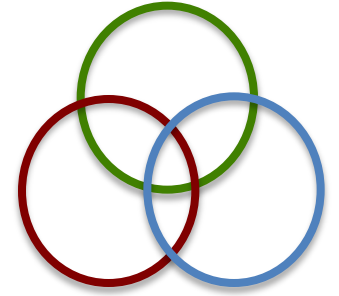


US-China Collaboration: Team Members

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 - Zhejiang University
- Yunpeng Zhao
 - Zhejiang University
- Zhiduan Chen
 - Botany, CAS, Beijing
- Haiyan Chu
 - Soil Science, CAS, Nanjing
- Yuan Zeng
 - Remote Sensing & Digital Earth, CAS, Beijing



Temporal Components of Modern Biodiversity



- What is the role of history in shaping modern biodiversity?
- (i) plant and microbial codiversification
- (ii) geographic patterns of variation in community diversity, structure, and function
- (iii) the relative roles of historical constraints and local adaptation in shaping community and ecosystem species, genetic, and functional diversity



EA-ENA Floristic Disjunction

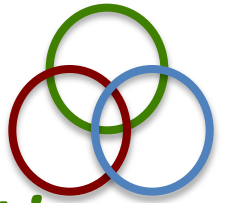


- EA-ENA forests provide an excellent system to examine the link between biodiversity and ecological function, within the context of a shared geographic and phylogenetic history.



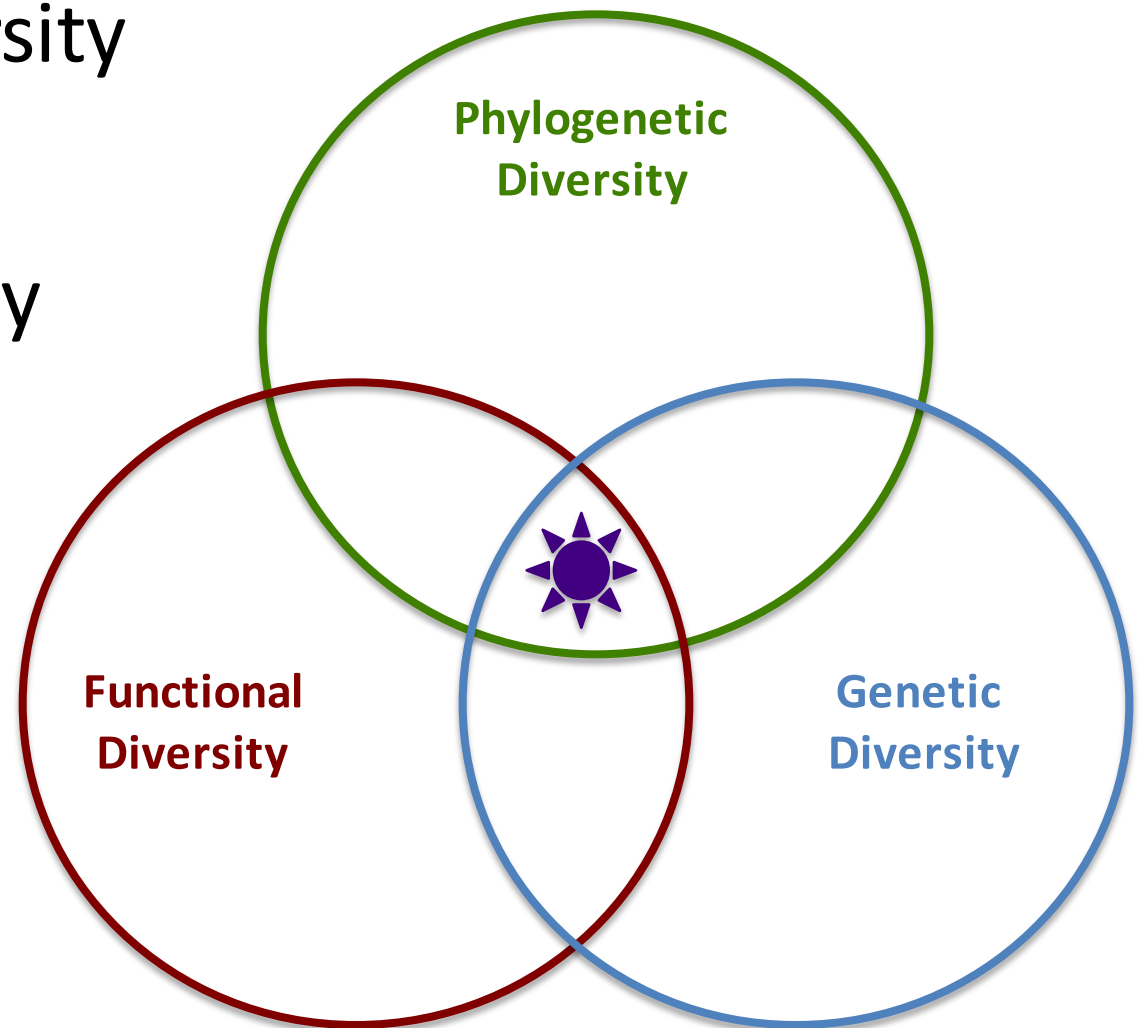
Fig. 1. Approximate geographic distribution of genus *Liriodendron*.

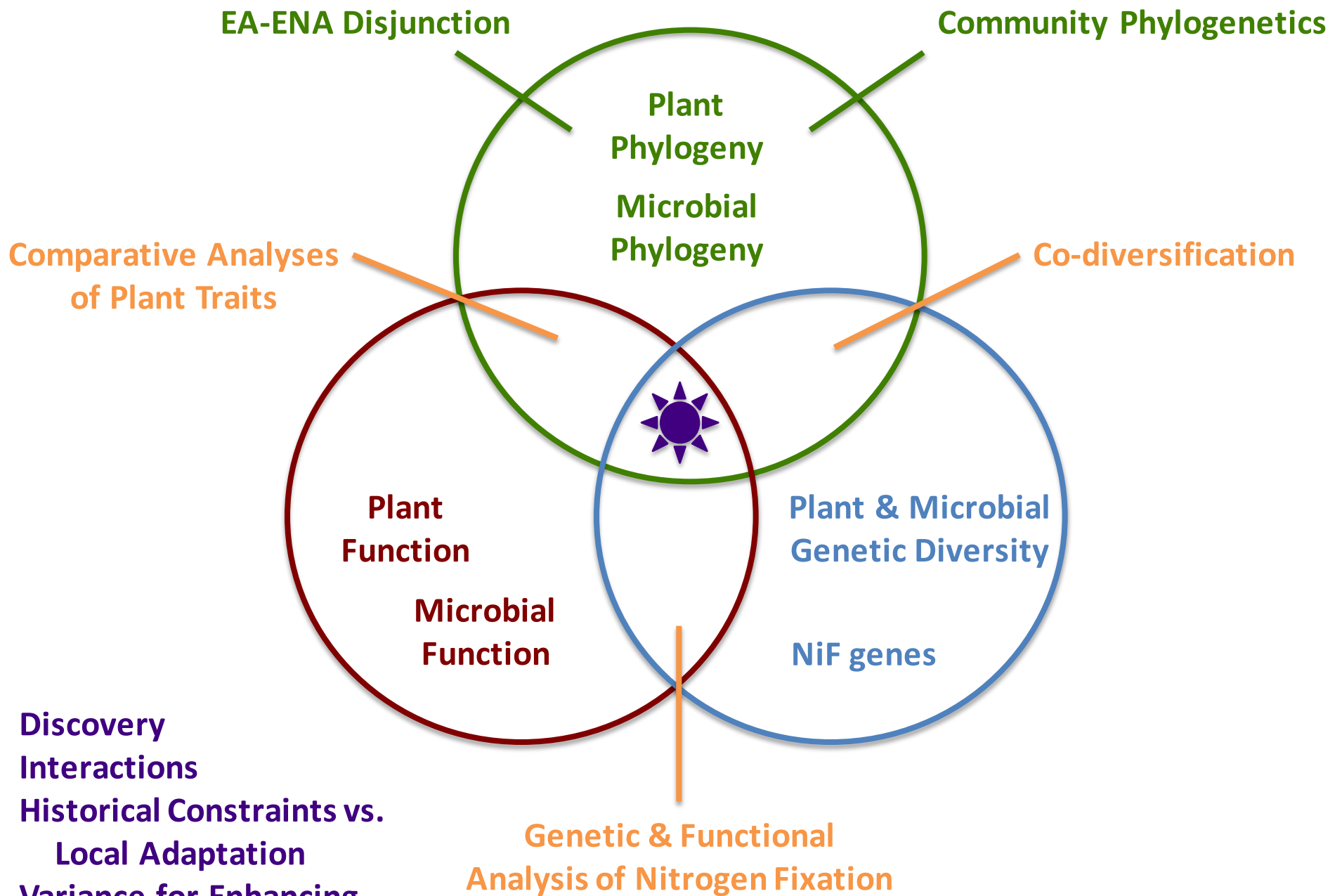
Questions to be Addressed:



Evolution of landscape diversity and function in the disjunct forests of EA & ENA

- Phylogenetic Diversity
- Genetic Diversity
- Functional Diversity
- Climate Change
- Integration





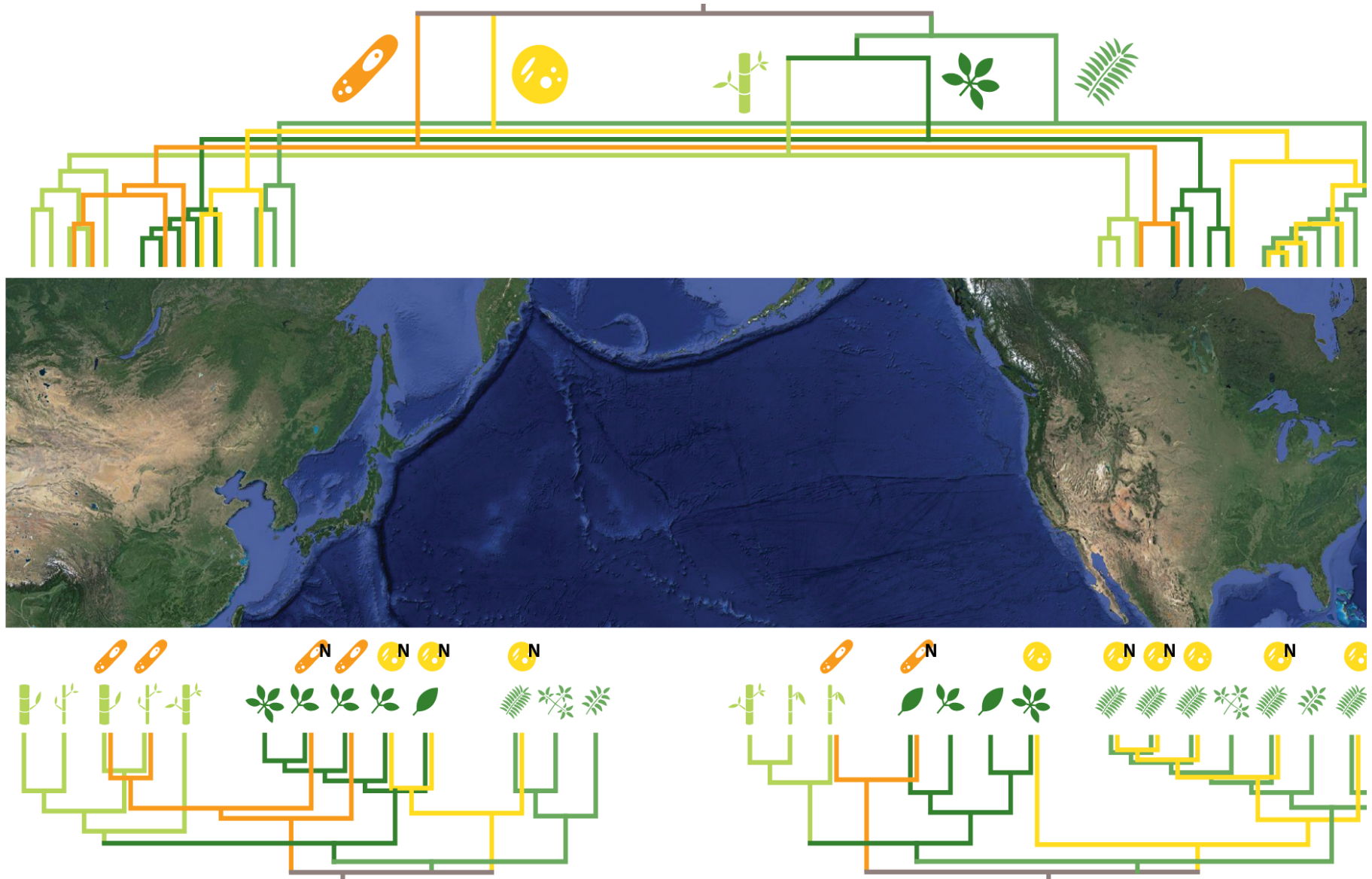
- **Discovery**
- **Interactions**
- **Historical Constraints vs. Local Adaptation**
- **Variance for Enhancing Climate Models**

Integrating Plant and Microbial Phylogenetics

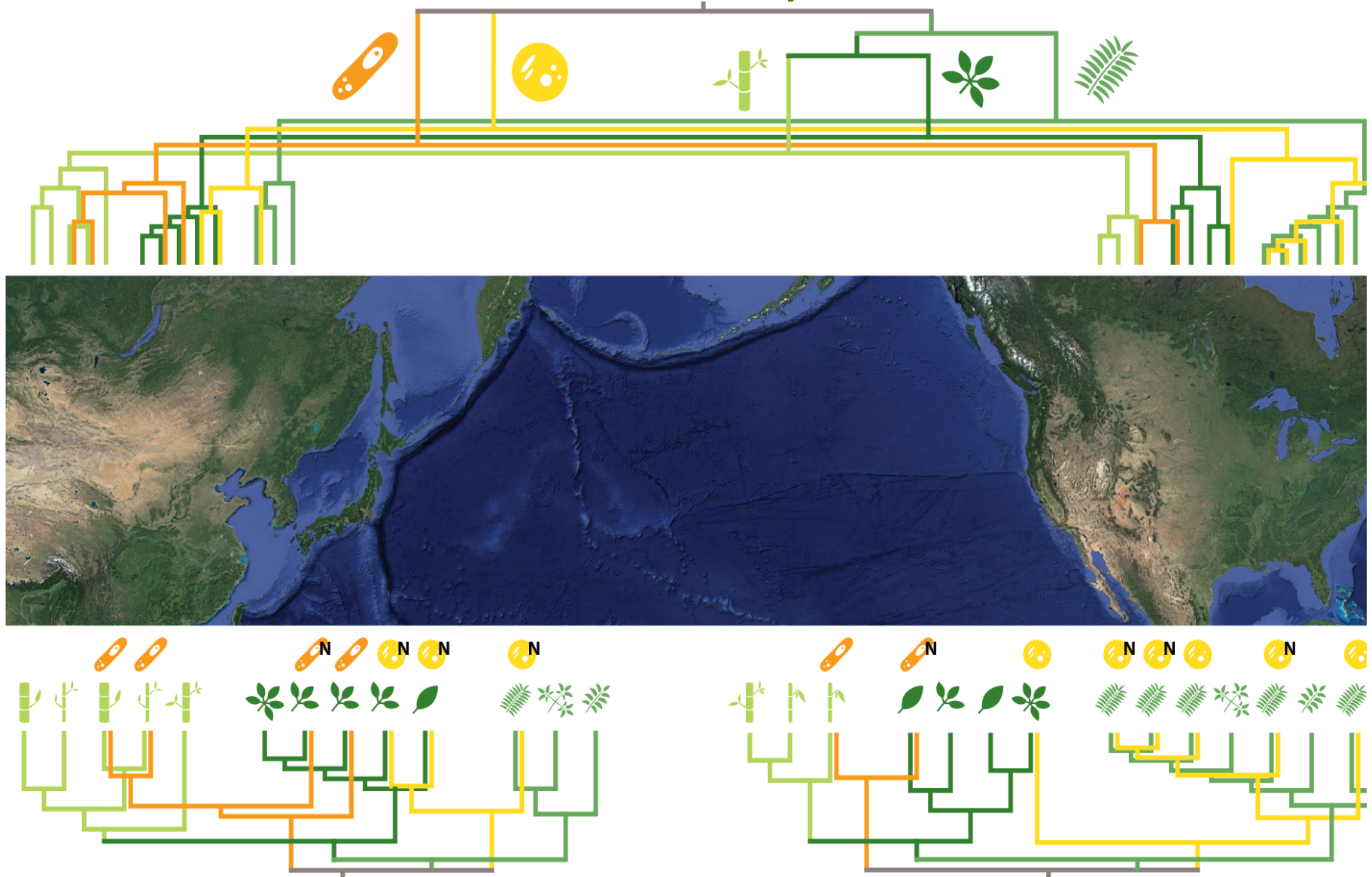


Are phylogenetic patterns congruent?

Integrating Phylogenetics and Plant Trait Data



Integrating Phylogenetic, Genetic, and Functional Data over Space and Time

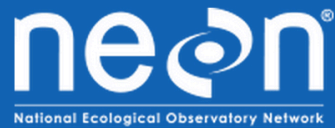


Sampling Design

- 6 sites in eastern US, 4 sites in China
- At each site:
 - Plant traits for 20 species of disjuncts (5 individuals) (mostly canopy trees)
 - Subset of traits for 100 additional species
 - 20-30 species for phylogenetics of disjuncts
 - Up to 300 species for community phylogenetics
 - Microbial sampling: 4 soil cores + leaves for same individuals scored for plant traits
 - Mapping of canopy trees via Remote Sensing



NEON Sites: 6 sites in ENA



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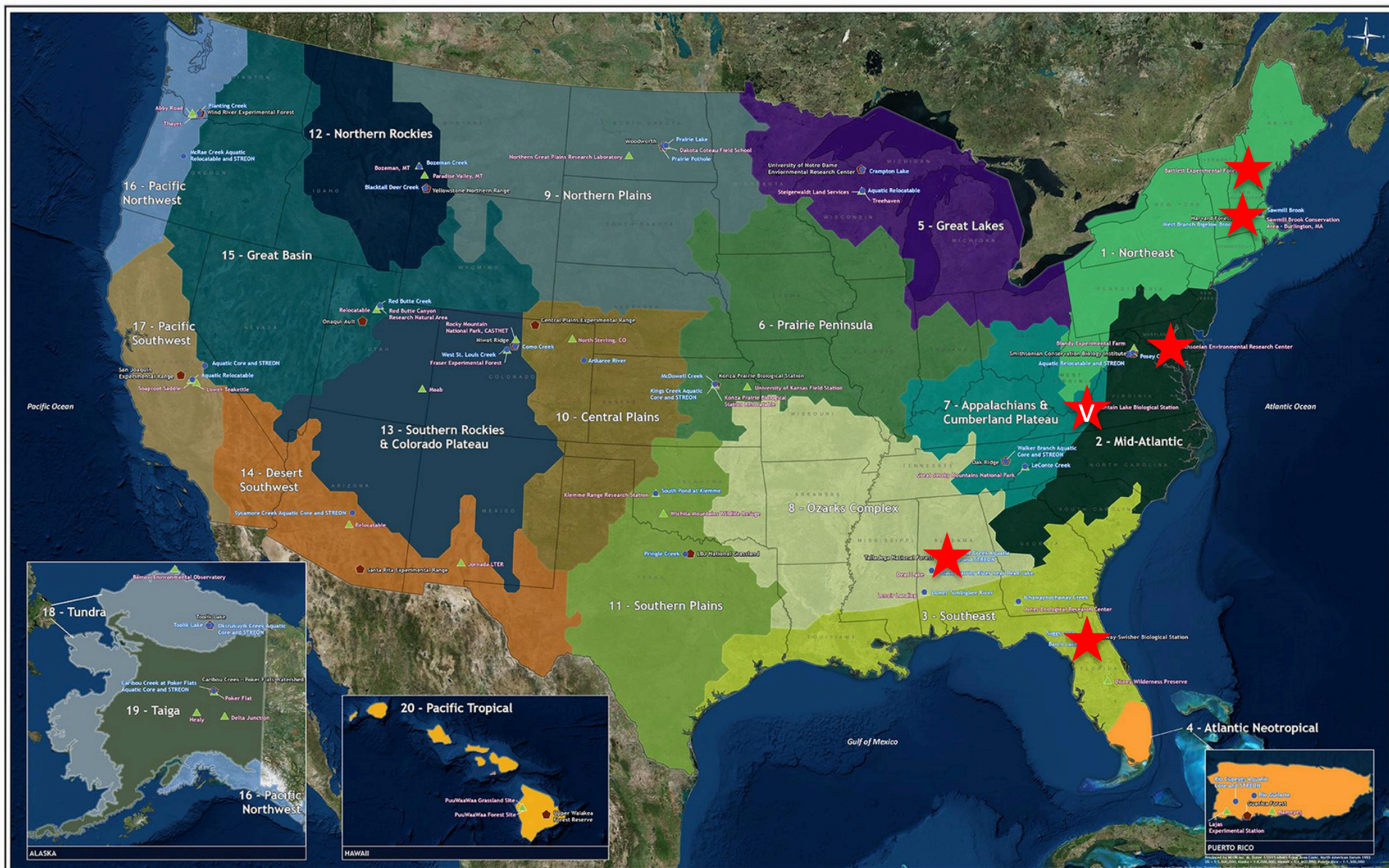
ABOUT

UPDATES & EVENTS

The **National Ecological Observatory Network** is a continental-scale observation system for examining ecological change over time.

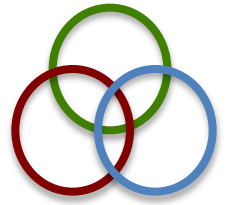
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NEON Sampling Locations



● NEON Aquatic ● NEON Core ▲ NEON Relocatable

The National Ecological Observatory Network is a project sponsored by the National Science Foundation and managed under cooperative agreement by NSF, Inc. NEON, Inc. is an information system for data integration and analysis. The NEON network consists of 20 regional observatories and experiments, each with its own experimental design and data management system. The NEON network is designed to provide a comprehensive, long-term, multi-scale, and multi-disciplinary view of the Earth's ecosystems. The NEON network is designed to provide a comprehensive, long-term, multi-scale, and multi-disciplinary view of the Earth's ecosystems. The NEON network is designed to provide a comprehensive, long-term, multi-scale, and multi-disciplinary view of the Earth's ecosystems.



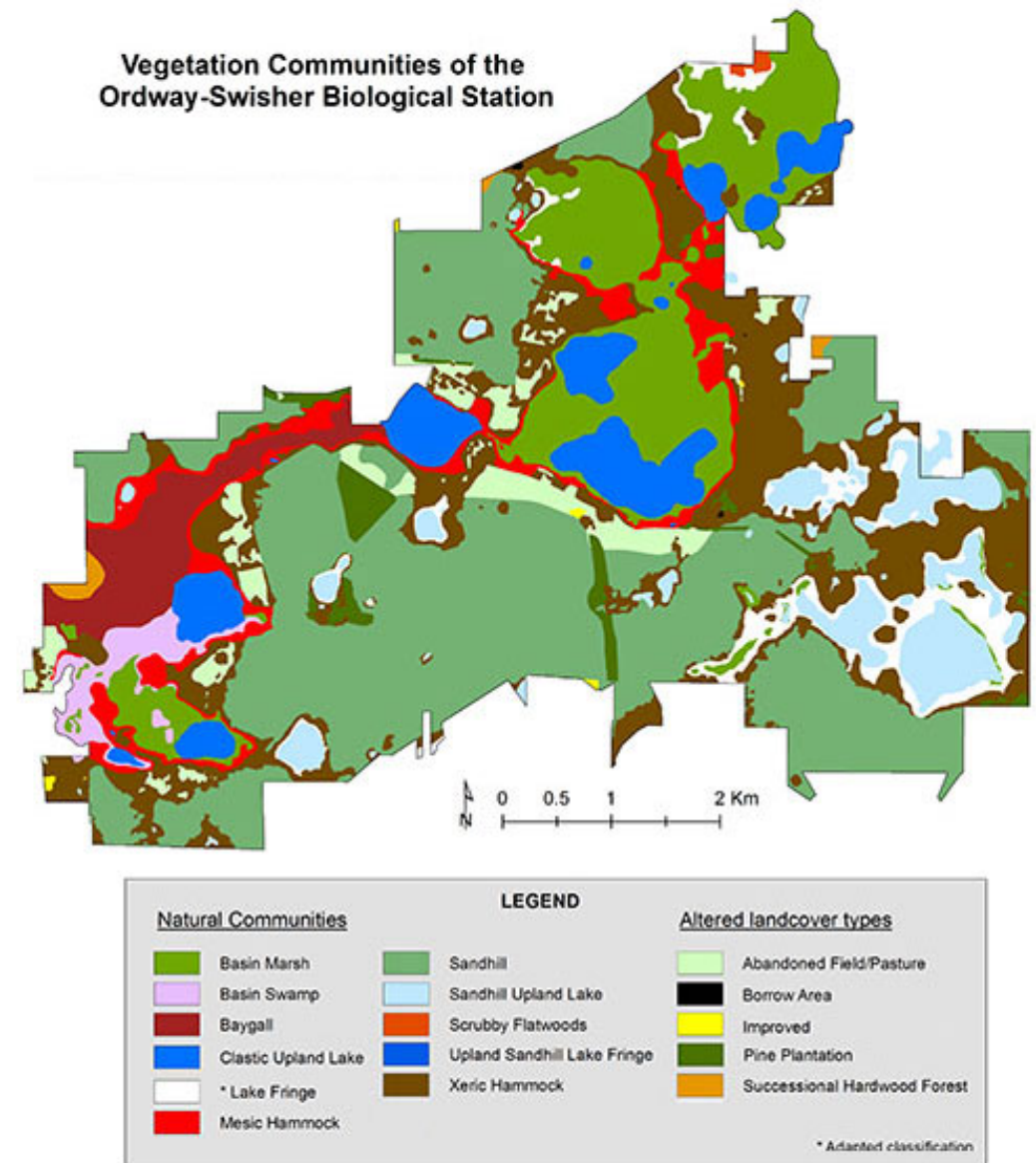
Functional Diversity: Plants

- Plant Functional Traits: physiological, morphological, chemical, and ecological characteristics of plants
 - primary determinants of C and nutrient cycling and of fluxes of energy and matter between terrestrial ecosystems and the atmosphere
- Leaf mass per area (LMA); seed size; maximum height; wood density; concentrations of C, N, P, and lignin in live and senesced leaves
- Linkages between plant phylogenetic and functional diversity, microbial diversity, and ecosystem function
- Functional consequences of the EA-ENA disjunction



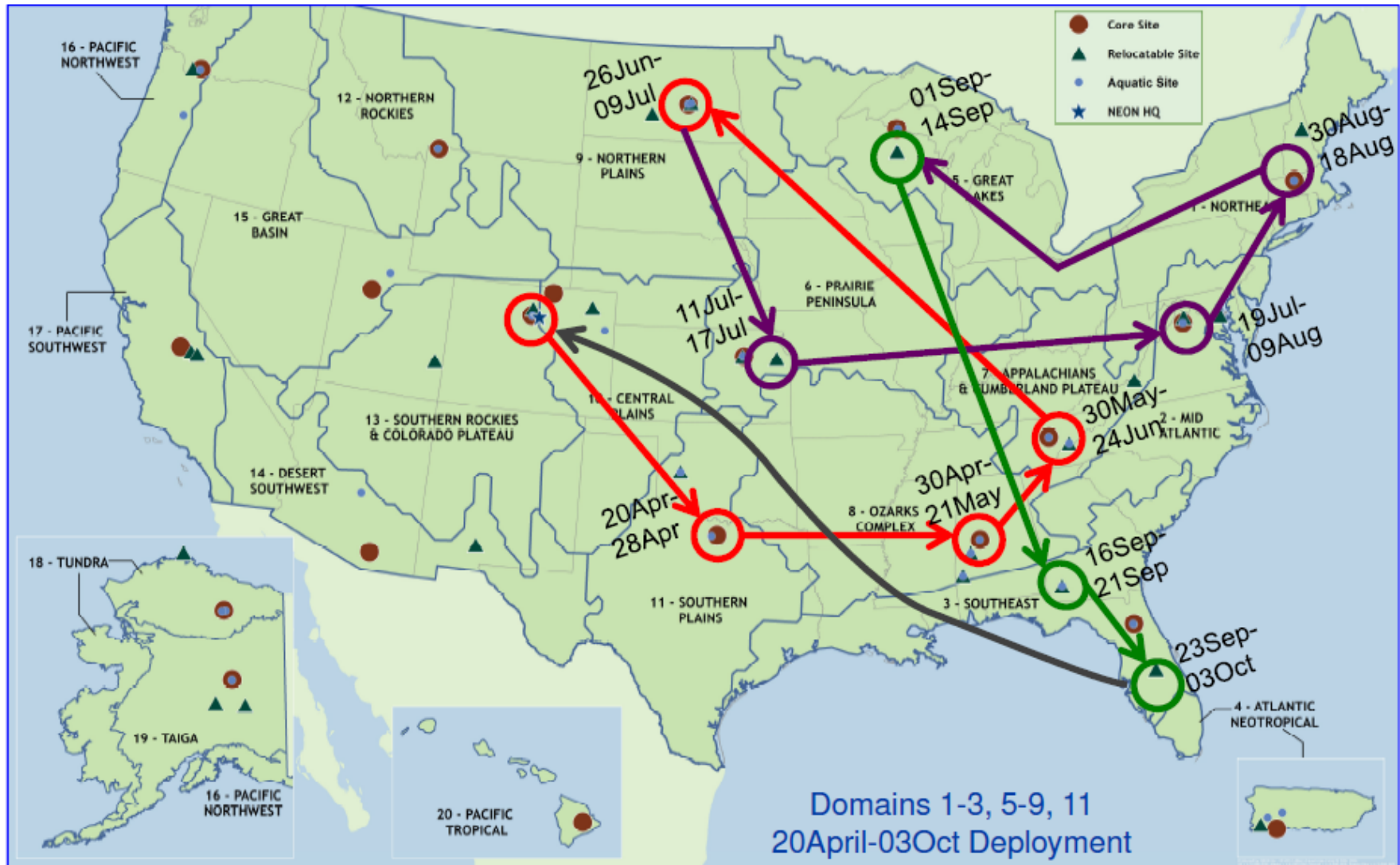
Community Phylogenetics

- Analyses of community structure and phylogenetic diversity at multiple scales
 - Random samples of 300 species
 - Vegetation communities

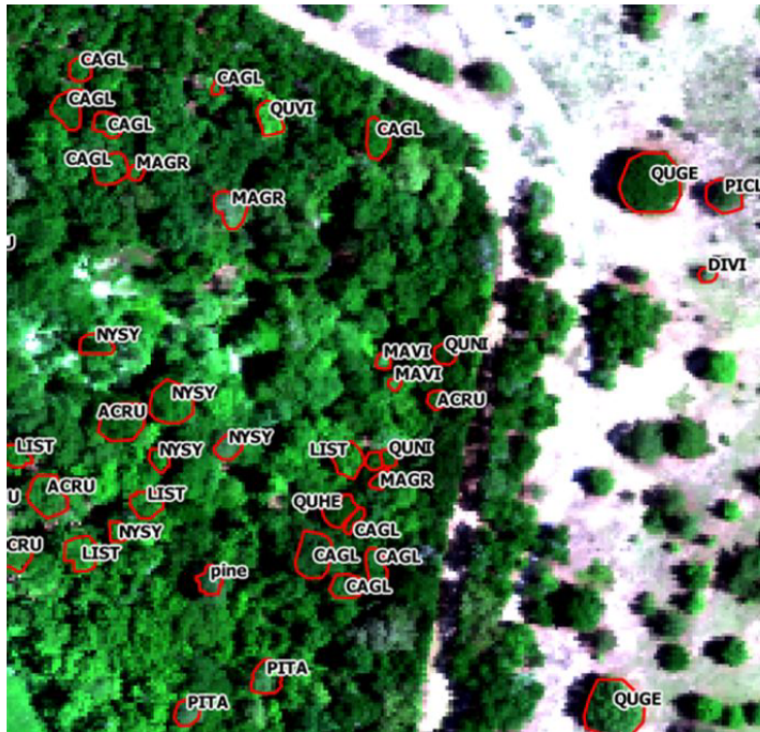


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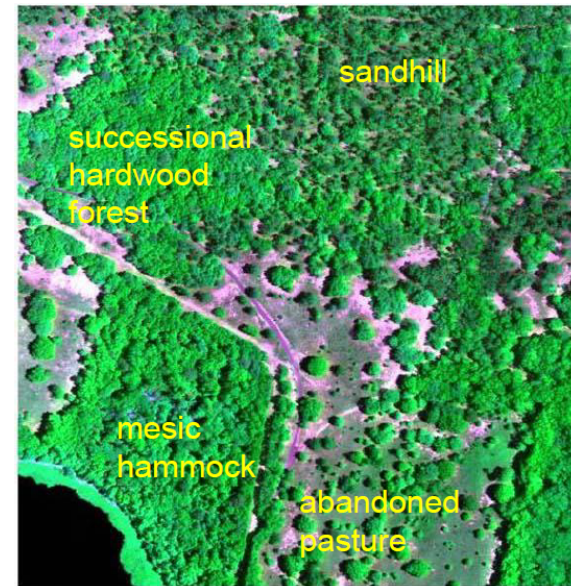
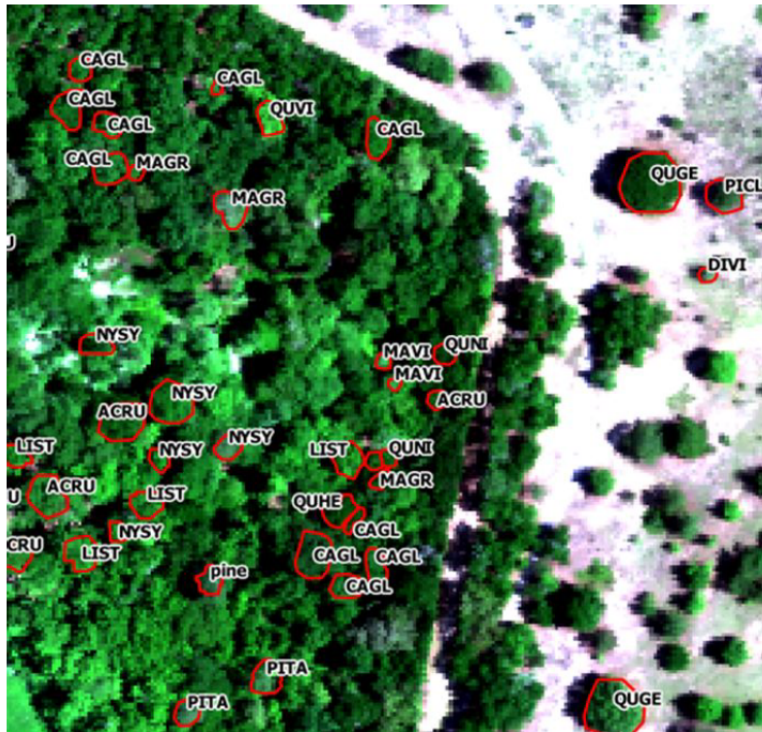


Using NEON Remote Sensing Data

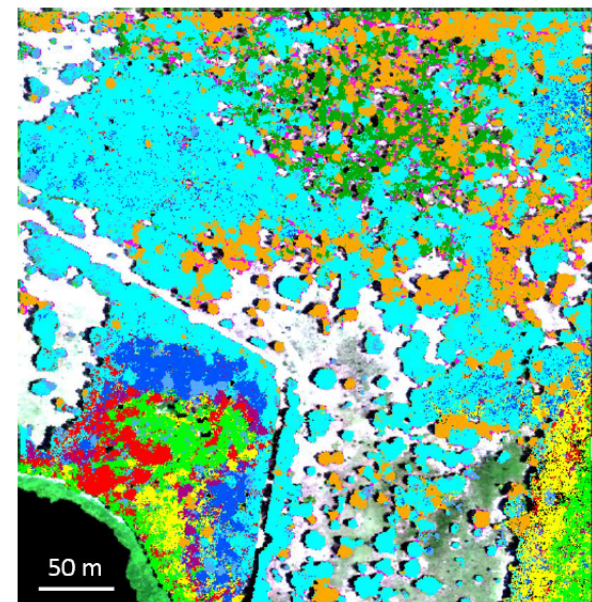


Mapping crowns at OSBS (FL)

Using NEON Remote Sensing Data



Mapping crowns at OSBS (FL)



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Chinese Ecosystem Research Network



中国生态系统研究网络
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- ◆ 美国俄克拉荷马大学骆亦其教授访问环江站 [2015-06-15]
- ◆ 克隆整合对附生蕨类植物在林冠生境适应中的作用更加重要 [2015-06-12]
- ◆ 中国生态大讲堂第119讲“Model-Data Integrati... [2015-06-11]
- ◆ 成都山地所贡嘎山站参与完成的“裸露边坡土壤修复关键技术及成土特性”... [2015-06-10]

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Connecting Specimens, Trees, Tools

