1

Arrowleaf Elephant's Ear, *Xanthosoma sagittifolium* (Araceae)

Malanga (Cuba), **Yautía** (Puerto Rico), **American Taro**

Spanish yautía. malanga (Antilles), macal (Mexico -Yucatan). quiscamote (Honduras), tiquisque (Costa Rica), otó (Panama), okumo (Venezuela), uncucha (Peru), gualuza (Bolivia), malangay (Colombia); *Portuguese* taioba, mangareto, mangarito, mangarás (Brazil): ***French***. chou Caribe (Antilles): **other languages** queiquexque (Mexico), tannia taniera (Antilles)


Photo: Herbolario Allium (CC BY 2.0)


Photo: Eric Guinther (CC BY-SA 3.0)

2

Fish diversity (Lowe-McConnell 1987)

~20,000 globally, ~6,650 in tropical fresh

Europe: 190 | Mississippi: 250

Congo: 560 | DRC: 700 | Amazon system: ~1,300

Kolmann, M.A., Kalacska, M., Lucanus, O. *et al.* Hyperspectral data as a biodiversity screening tool can differentiate among diverse Neotropical fishes. *Sci Rep* **11**, 16157 (2021). https://doi.org/10.1038/s41598-021-95713-0

Arapaima aka Pirarucu (*Sudis gigas)*

3

Principle of Competitive Exclusion (Gause 1934)

two species cannot inhabit the same niche;
one will consistently out-compete the other

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Conditions of the PCE:

1. Growth of both species is limited by the same resource.

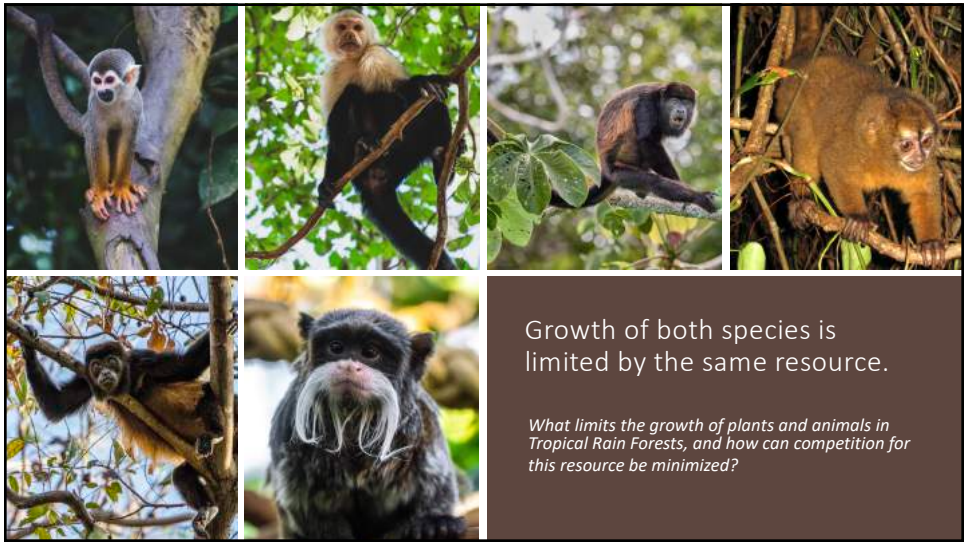
2. The environment is constant (both in space & time)

3. In a given environment, all species – both rare & common ones – have similar rates of birth, growth, and death.

4. Species have the opportunity to compete.

5. It takes time for exclusion to take place…so enough time has passed for that to happen.

8


Growth of both species is limited by the same resource.
What limits the growth of plants and animals in Tropical Rain Forests, and how can competition for this resource be minimized?

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Sword-billed hummingbird

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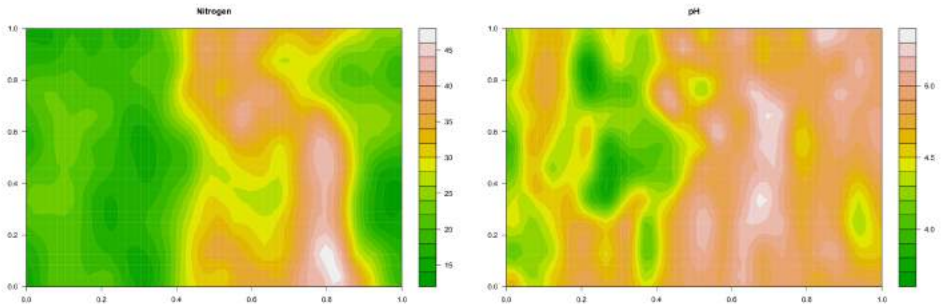
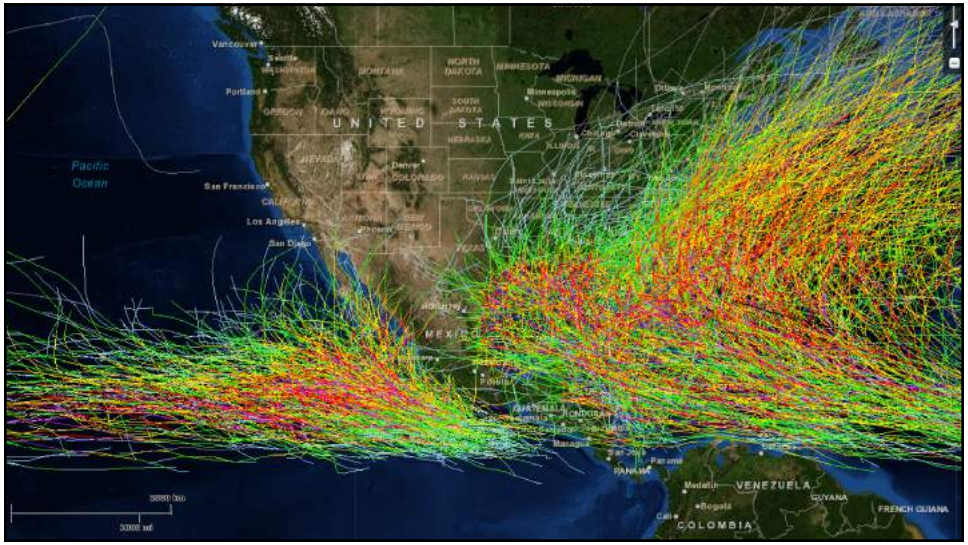
11

BCI 50-ha Plot



12


Vancouver
Seattle
WASHINGTON
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NORTH DAKOTA
MINNESOTA
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Portland
OREGON
IDAHO
WYOMING
SOUTH DAKOTA
WISCONSIN
Minneapolis
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IOWA
ILLINOIS
UNITED STATES
NEVADA
Denver
COLORADO
KANSAS
Pacific Ocean
San Francisco
CALIFORNIA
Los Angeles
San Diego
MEXICO
Monterrey
Puebla
GUATEMALA
Managua
PANAMA
Panama
Medellin
VENEZUELA
GUYANA
Bogota
Cali
COLOMBIA
FRENCH GUIANA

13

14

15

3. In a given environment, all species – both rare & common ones – have similar rates of birth, growth, and death.

This is a tough one. *Can you imagine situations where being common - meaning you are surrounded by others of the same species - would be beneficial to your growth or survival? Are there situations where it would be detrimental?*

16

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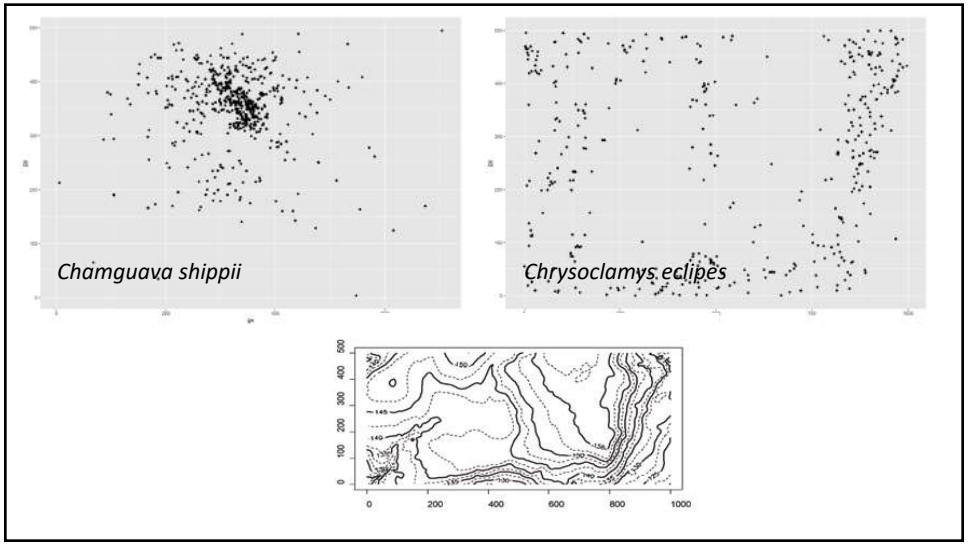
4. Species have the opportunity to compete.

Based on the graph we made in class last session, do you think this is true? Are there ways that species can avoid competing with each other?

20


Chamguava shippii
Chrysoclamys eclipes
0
200
400
600
800
1000

21

22

5. It takes time for exclusion to take place…so enough time has passed for that to happen.

How long do individuals of tropical species live? Do the conditions for the PCE hold for this long?

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