

Comparative phylogeography of oceanic archipelagos: Hotspots for inferences of evolutionary process

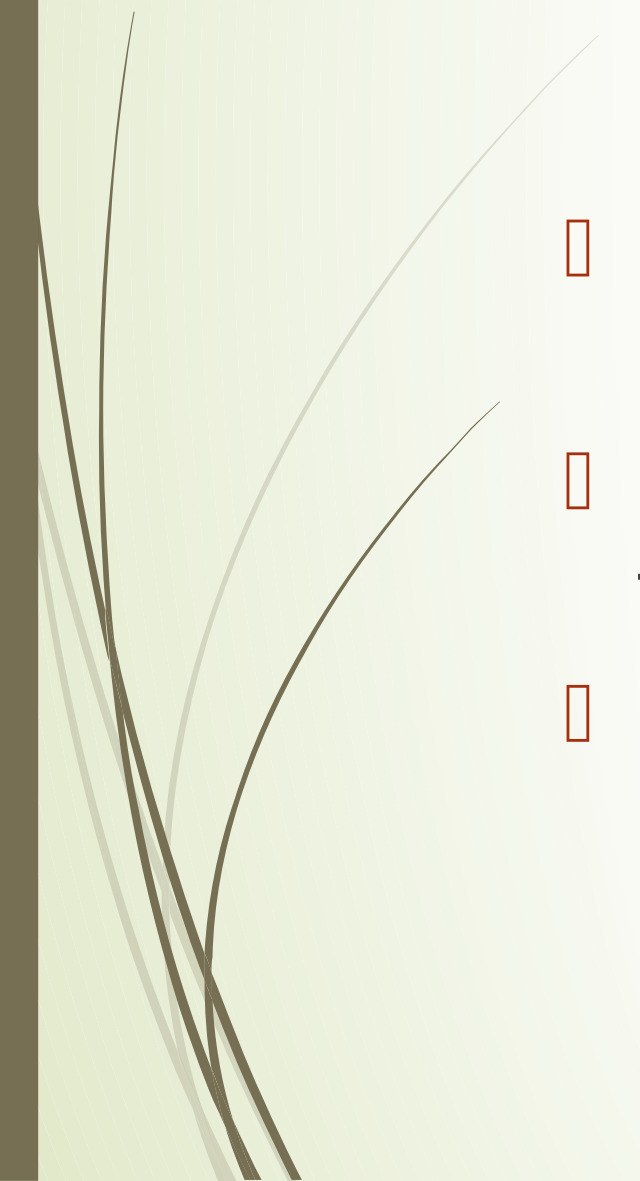
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Laupala Cricket



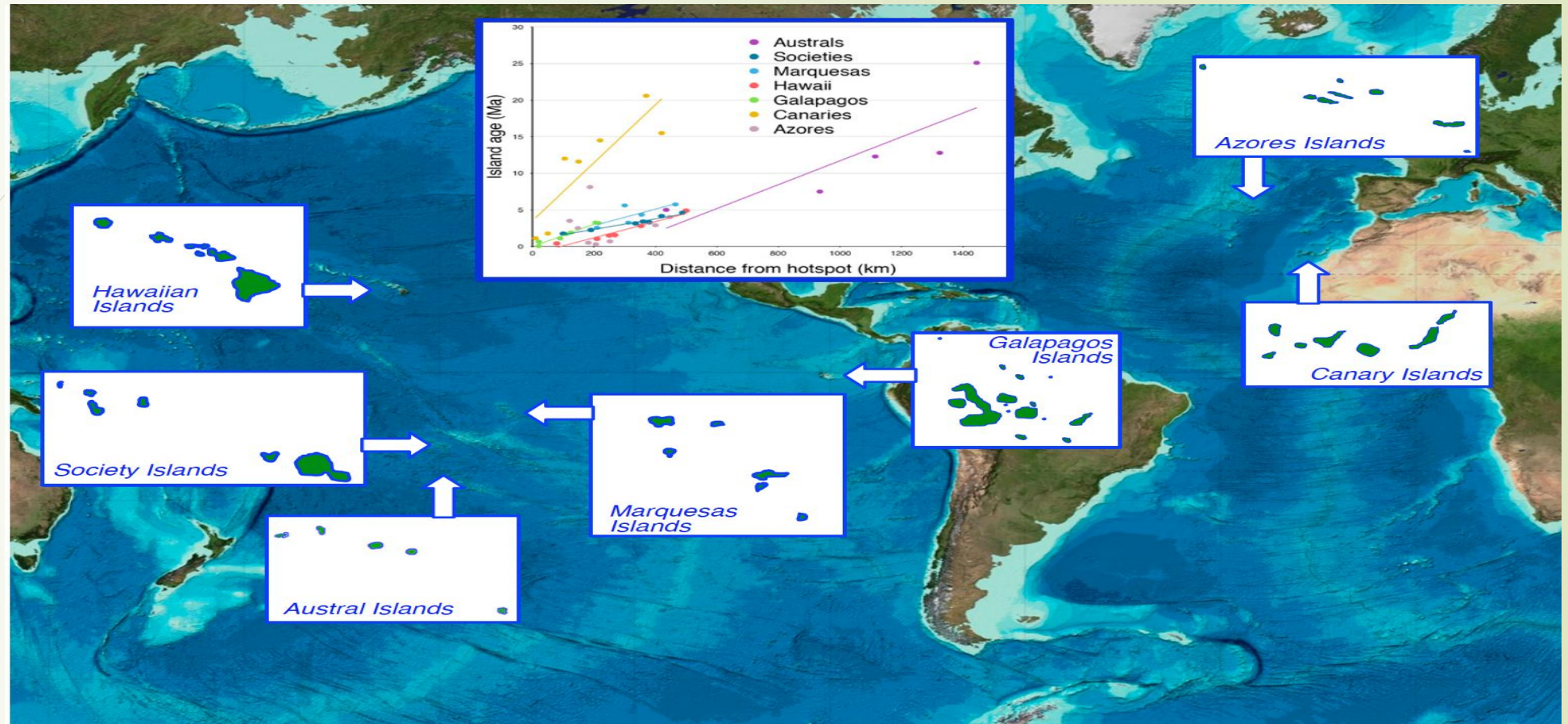
Main Points

- Review recent discoveries of the progression rule
 - discuss advantages that progression offers to the study of community assembly
 - describe results from two compelling cases of progression
- 



Why Is this important?

- “Relict” Organisms
- Young and simple Communities
- Hotspot Volcanism
- Small in size and extreme Isolation
- Display adaptive radiation
- Imbalance of taxonomic representations
- Profound impact on our understanding of community assembly



Map of the Seven Archipelagos



Persistence of the Progression Pattern and the Evolution of Community Assembly

- ▮ suggest a temporal frame of reference
- ▮ a unidirectional path of colonization
- ▮ arrive, establish, and diverge



Biotic Resistance on an Evolutionary Timescale

- ▢ colonization routes at odds with the chronosequence
- ▢ Priority effect
- ▢ Niche preemption
- ▢ Back colonizing

Biotic Turnover on an Ecological Timescale

- ▢ Prevents genetic differentiation from accumulating
- ▢ Equilibrium Theory of Island biogeography
- ▢ Species richness

Reconciliation & the Mosaic Genome

- The Big Questions
- Their hypothesis
- Late colonizers offspring fitness is decreased
- What is The Mosaic Genome
- Remember the Laupala Cricket?





Summary

- One of the most widespread phylogeographic pattern
- Over evolutionary time; develop during transition
- Geographic and Chronological setting of Archipelagos
- Priority Effects
- Admixture of resident colony and invader



Thank you

Credits:

http://ashipunov.info/shipunov/school/biol_330/presentations/shaw2016_phylogeogr_ocean_archipelagos.pdf

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Key Words

Nuclear Phylogeny: Phylogeny composed from nuclear DNA

mtDNA: Phylogeny composed from mitochondrial DNA

Comparative Phylogeny: Defined as the study of effects of evolutionary history and biogeography on the distribution of genetic variation of co-distributed species.

Evolution: Process by which organisms change over time as a result of changes in heritable physical and behavioral traits.

Archipelagos: An expanse of water w/ many scattered islands

Clade: A group of biological taxa (such as species) that includes all descendants of one common ancestor. Can be drawn based on phenotypes or DNA sequences.

Class: The subdivisions of a phylogeny (ie. Mammals -> homo sapiens)

Species Radiation (Adaptive Radiation): A process in which organisms diversify rapidly from an ancestral species into a multitude of new forms.

Particularly when a change in the environment makes a new resource available.

Progression Rule: A progression rule (or pattern) refers to a phenomenon of phylogeographic concordance with island age, whereby older lineages map to older islands within an archipelago, and younger lineages map to progressively younger islands in that system.

Speciation: The formation of new and distinct species in the course of evolution.

priority effect: once the first colonist (a founder) establishes in a newly available habitat, it

soon monopolizes resources in the critical dimensions of the niche and blocks subsequent

community assembly: is the study of the processes that shape the identity and abundance of species within ecological **communities**

radiation zone: Zone of archipelagos that are line up together

mosaic genome: specific regions can have separate historical identities, some reflecting a history of progression, and others reflecting additional demographic complexities (such as backmigrations)

Niche: the ecological role of an organism in a community especially in regard to food consumption

Propagules: a vegetative structure that can become detached from a plant and give rise to a new plant, e.g., a bud, sucker, or spore