Bio Diversity Exam 2 Notes

Speciation requires multiple steps

1. Populations of a single species become isolated from each other and over time those pops diverge (become different).

-----> relative to their gene pool (allele frequencies associated w/particular traits.) -->could occur through NS (as environment may differ btw the pops loss of gene flow (no interbreeding).

- Mutations will differ btw populations
- genetic drift

→ limits allele diversity in newly isolated populations

- diffs in allele diversity in pops become fixed
- genes become increased common/ significant in pops
- @ this point each pop is limited in its ability to respond to new selective pressures
- → driven by allele diversity

Speciation by drift

- humans of species
- each species has elaborate courtships/ matingritials
- → female will only respond to the courtship rituals of male of its own species

Speciation: populations of a single species become diff through reproduction isolation

- → NO GENE FLOW
- → likelihood of genetic divergence (traits)- mutation, NS, genetic drift

2. Other isolating mechs evolve, maintaining diffs/ genetic divergence

- → selection against mating
- → particular if there are costs associated with interbreeding
- → hybrid infertility/ in viability
- → basically reproduction is very energy expensive
- → mating w/a member of the isolated population is dead end
- reinforcement: after initial divergence of pops other isolating mechs prevent/ reduce interbreeding
- → allowing maintenance of genetic diffs

hybridization does occur: some hybrid infertility/ inavailibitlity

- → when pied/ collard mate...
- → egg produced
- → decreased survival
- from egg-> juv

Speciation by NS

- a small pop of anoles id released on a empty island
- if you go back 5, 10 years later, started as a tree trunk morph

- food/ habitat become selective pressures

Allopatric Speciation

- populations are geographically isolated from each other; barrier-new something that decresed dispersal/ gene flow
- speciation likely takes a long time: affected strongly by genetic drift/ NS
- however it can also happen rapidly
- adaptive radiation
- Adaptive Radiation: rapid production of any new spp.
- Generally dealing w/ closely related spp. (new) recently evolved from a common ancestor- adaptation by diffs groups of organisms to diff parts of the environment speciated foraging (e.g specialized adaptation)

Example of Adaptive Radiation: African chichilds, African Rift lakes target points of adaptive radiation.

- Each lake tends to have its own species flock subset of ravine species
- → exposed to changing selective pressures

Sympatric speciation

- much less common than allopatric
- organisms occur together with no geographical isolation
- should see increased likelihood of mating (limited isolation)
- limited genetic divergence
- however speciation can still occur
- example: mutation occurs where snail coiling reverses
- → mechanical isolation change in terms of host plants
- geological isolation

Speciation takes a long time to occur.....

- Gradualism
- → change occurs gradually
- intermed forms are present

Speciation can also occur rapidly

- → Punctuated Equilibrium
- Short burst of evolutionary change which can result in speciation
- → mutation occurs
- feather color small change

extinction: loss of an entire species

- → vastly more extinct species than currently existing species
- → also opens up new niches that allow population

separation genetic divergence, possibly speciation

- → extinction can be associated w/ catastrophe
- → e.g asteroids collide w/earth
- 65 million years ago an asteroid hit @ chicxulub

increased dust in atoms → decreased sunlight → decreased light → plants → may lead to food limitation.
Decreased sunlight → decreased temp → increased effect on reptiles/ amphilla-fishes-mammals-birds

Chapter 23 Systematics & Phylogenetic

- coming up w/standardized naming system is critical
- method of classifying and naming orgs w/in an evolutionary framework
- → structural, habitat, adjectives for description

TODAY
→ 1.5 million named species
→ another 3.5-30 million unnamed species
→ technique/ tool for reconstructing evolutionary histories/ relationships based on direct evid of common ancesting (fossils, shared characteristics, gene sequences)

Goals of Systematics

- inventory of all living things
- → develop universal system for naming organisms- TAXONOMY
- determine evolutionary relationships among organisms

Taxonomy started with Carolus Linnaeus

- wrote a book "System nature"
- → binomial nomenclature: each species has its own 2-word name
- "Genus Species" (Homo Sapiens)
- all names were in Latin (dead language), good because no one is working with the language other that with science
- universal name
- does not vary worldwide
- → came up with hierarchial nomenclature
- Domain-Carl Woese (highest now) micro-organisms (prokaryotes D.bacteria D. Archaea)
- Kingdom
- Phylum
- Class Order
- Family
- Genus
- species

Phylogenetics
→ describing evolutionary relationships
→ but on idea that classific systems should be built on evolutionary relationships as opposed to