Evolution 7

** TREE BUILDING SURVEY DUE ON-LINE TODAY!

- send answer to iClicker Question 4A now.
- Species formation
- Species definition
  - example
- Phylogeny Demo intro
- iClicker Question 4B

Due in lab this week:

⇒ pre-lab for Skulls & Evolution (lab manual p. 13 and on-line)

⇒ HMNH lab report (Just answer questions 1 thru 5).

⇒ Meet in W-2-030 & -032

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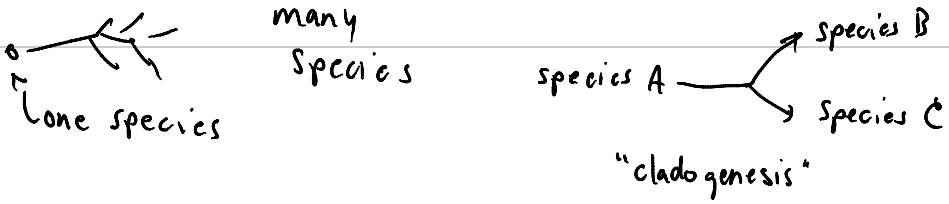
from last time:

- anagenesis (A → B) can't be "the whole story"

3500 mya — one species — now many species ∴ need



"cladogenesis"

How can a population split into 2 parts & the parts evolve along separate paths? (cladogenesis)

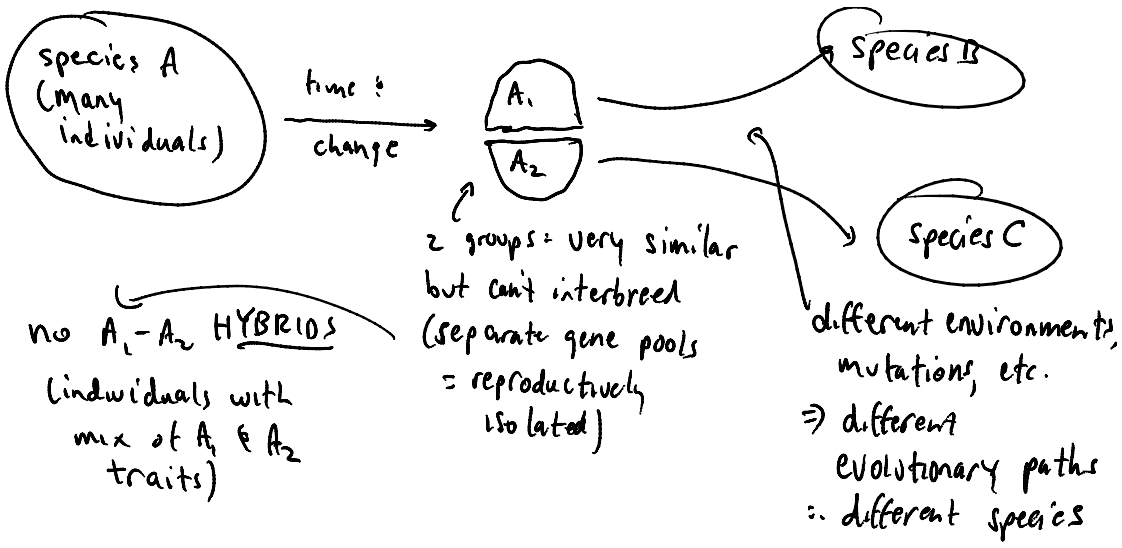
- if they share a common gene pool, they can only do A → B

  ∴ need separate gene pools

  = 2 groups that can't interbreed

  = reproductive isolation

one possible scenario (over many generations)



Reproductive isolation – How?

= can't mate & produce fertile offspring in nature

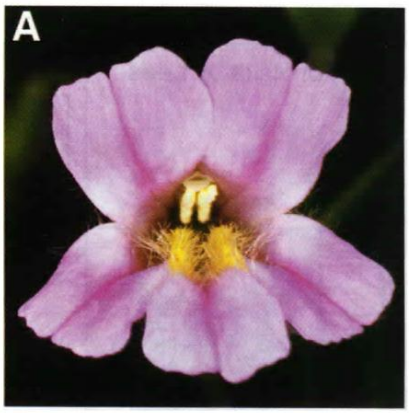
(if offspring can't reproduce → evolutionary "dead end")

possible ways

1. live far apart
2. physically can't mate
3. different mate preferences / behaviors
4. mate at different times
5. live in different environments
6. sperm don't attach to egg
7. inviable / infertile offspring
8. incompatable pollen
9. different pollinators

Examples of Speciation / Reproductive-isolation

Flowers: in nature, no hybrids found (but can cross in lab)



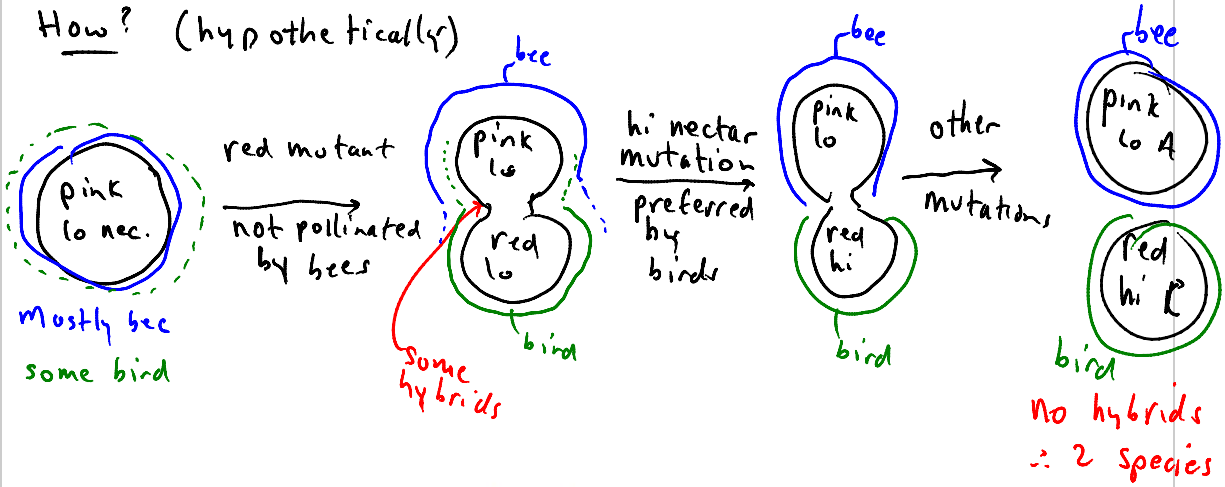
why?

Mimulus lewisii
bee pollinated
pink / low nectar

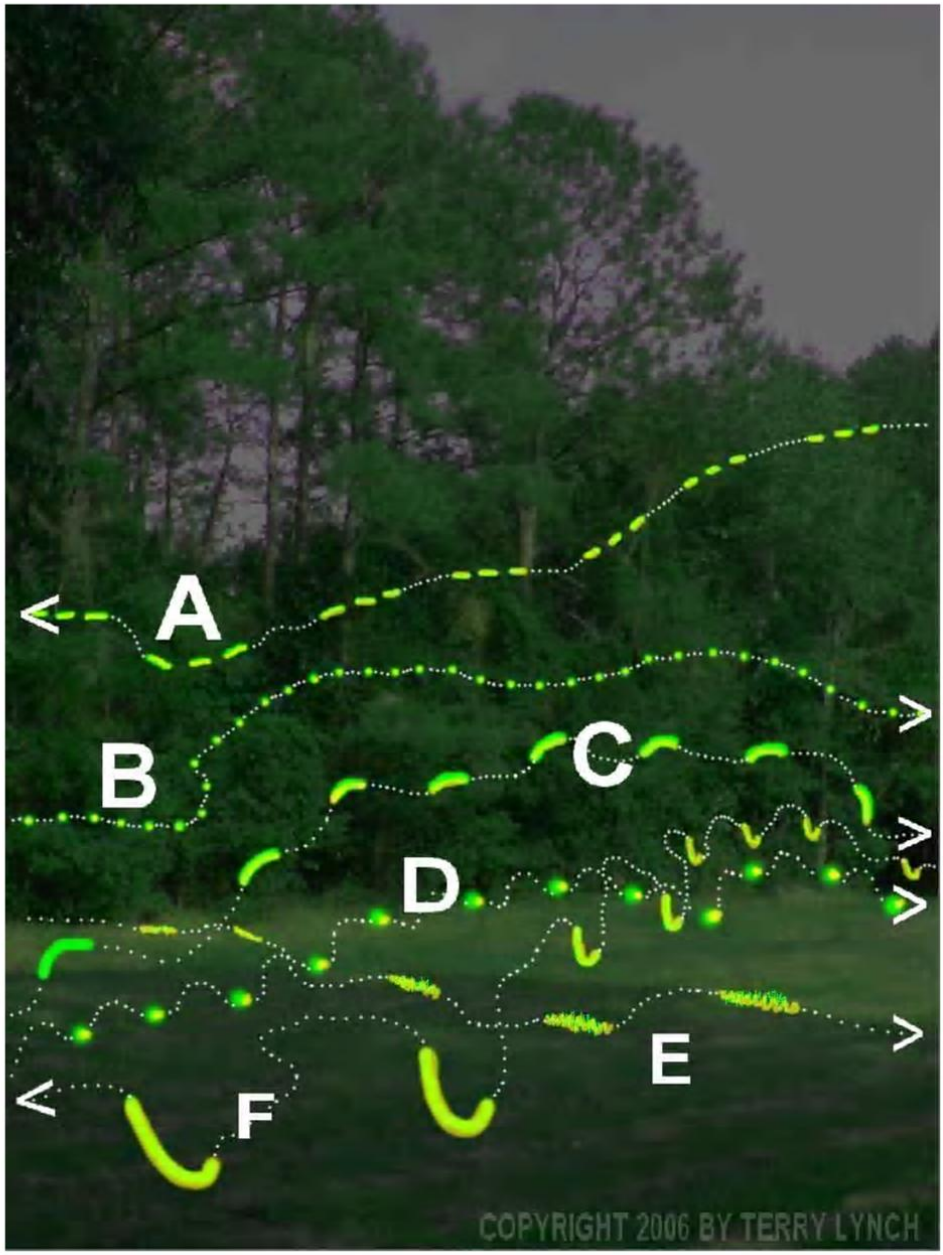
Mimulus cardinalis
hummingbird pollinated
red / high nectar

* bees prefer pink 4x more than red; bird doesn't care
* hummingbirds prefer hi nectar 2x more than lo nectar

How? (hypothetically)



Fireflies



http://byteland.org/naturalist/firefly_faq.html

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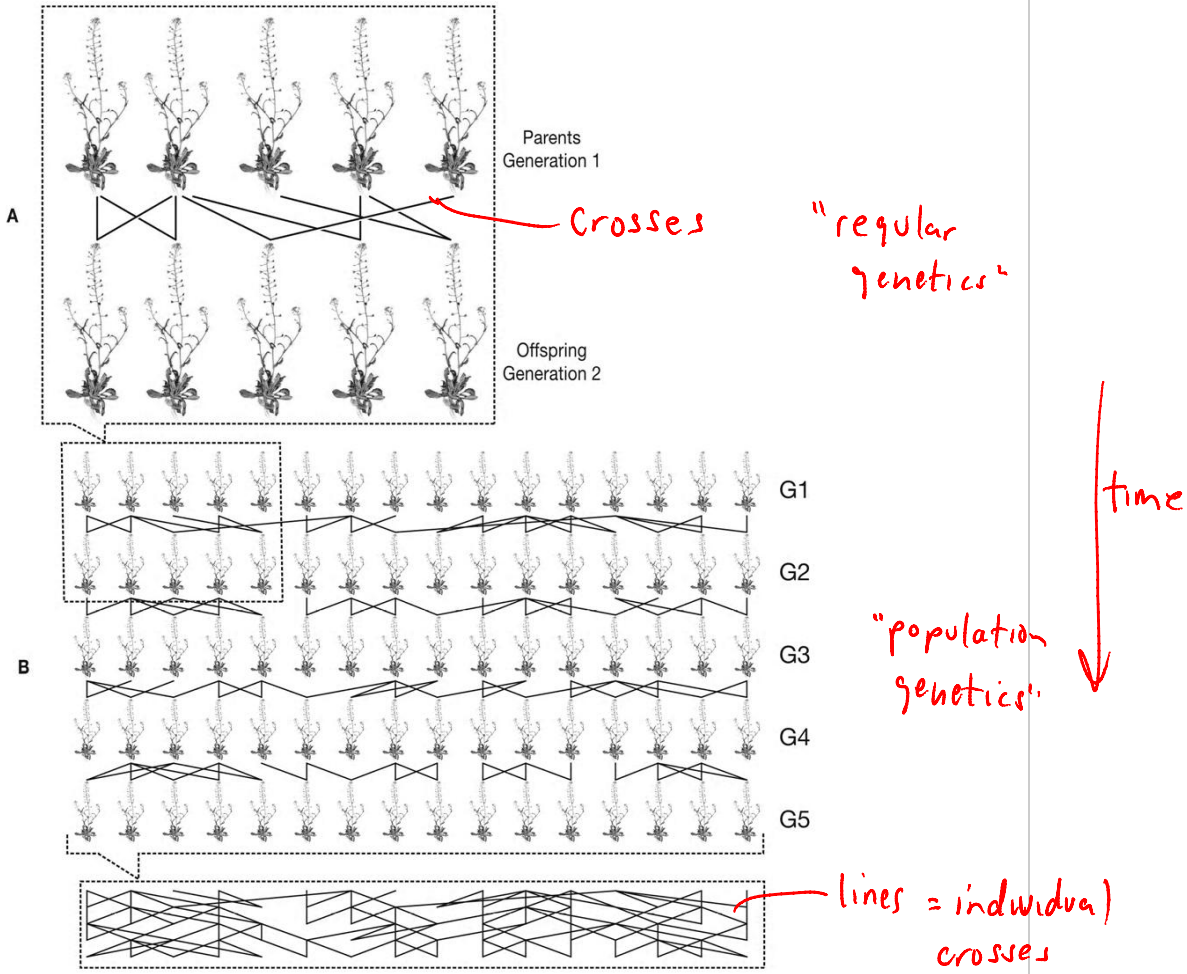
Speciation: the process



From ("Phylogenies & Tree Thinking" by David A. Baum and Susan Offner *American Biology Teacher* 70:4 222 [2008])

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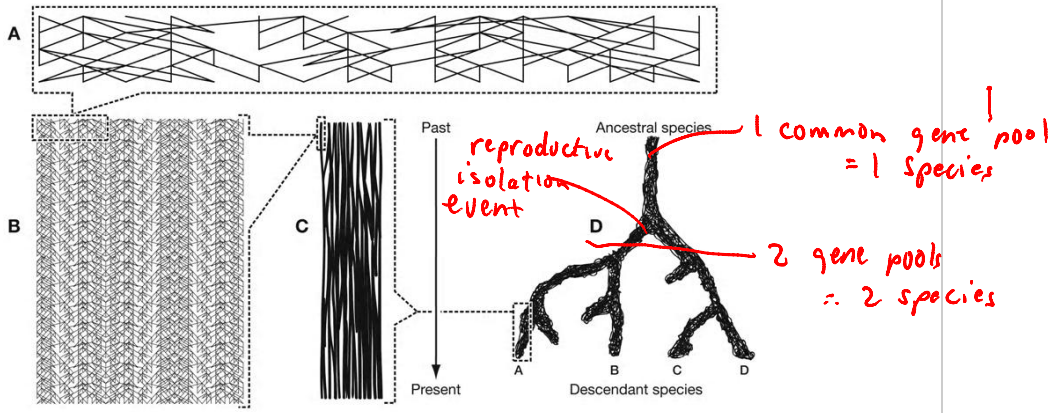
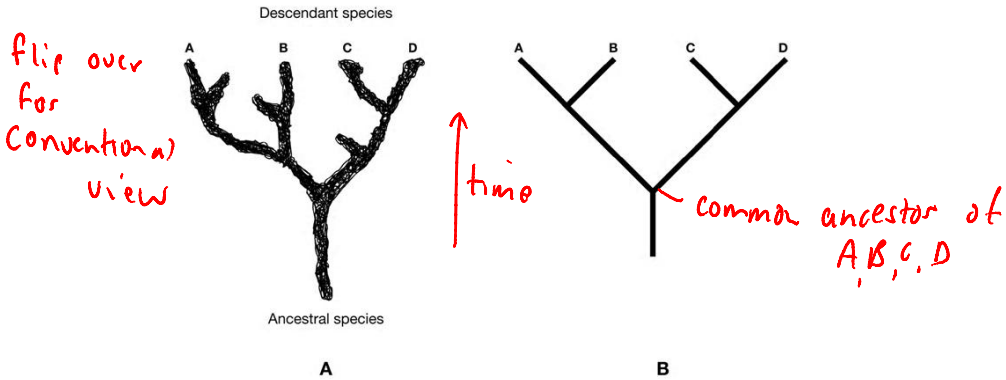


1 common gene pool = 1 species

reproductive isolation event

2 gene pools ∴ 2 species



flip over for conventional view

time

common ancestor of A, B, C, D

Definition of a species = "Biological Species Concept"

* different species are reproductively isolated in nature

- either can not or do not (in nature) mate or produce fertile offspring

(members of same species can & do mate & produce fertile offspring)

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Test = look for hybrids