

How to fill out the Blue Scantron Sheet for BISC 120 exams:

NAME – bubble in your last name, bubble in an empty bubble for a space, bubble in your first name

IDENTIFICATION NUMBER – your USC ID #

LECTURE SECTION – last two digits – columns **K & L** (for example **04** for 130**04**)

LAB SECTION: – last two digits – in columns **O & P** (for example **64** for 131**64**)

NAME (Last, First, M.I.)																		
BIRTH DATE IDENTIFICATION NUMBER SPECIAL CODES																		
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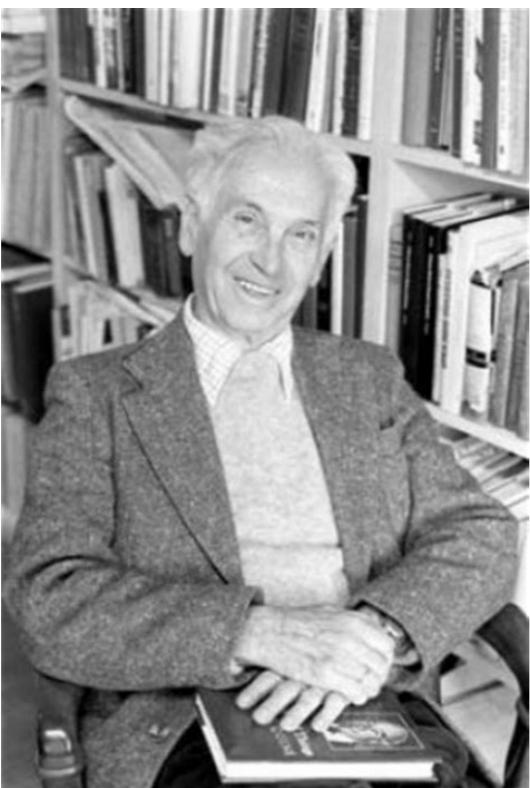
GENERAL PUR
SEE IMPORTA

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- Bring pen and pencil

Species

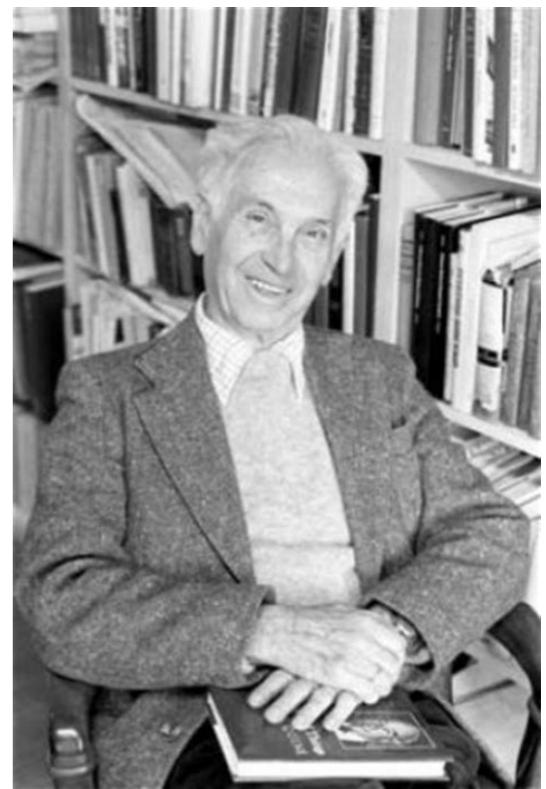
The most common definition of species today is the **biological species concept** (note: only works in sexually reproducing species) introduced by Ernst Mayr



(b) Diversity within a species

Species

The **biological species concept** by Ernst Mayr



- A species is a group of populations that can interbreed in nature and produce viable and fertile offspring
- Note: Some species might show morphological diversity (but with interbreeding), while other times isolated species can be almost indistinguishable (e.g. 2 spp. meadowlarks and 2 spp. gray treefrogs)



(a) Similarity between different species



(b) Diversity within a species

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Species

Key to the formation of new species

- **Reproductive isolation**
- E.g. tigers and lions never interbreed in nature: thus two species (they do interbreed in zoos, but offspring show poor health and low or nonexistent fecundity, again confirming that these are two species)



Limitations

-**Biological species concept** does not cover species that only reproduce asexually

-Some counterintuitive results e.g. brown bears (grizzly) and polar bears sometimes interbreed

Some other concepts:

-**Ecological species concept** based on unique ecological niche (but species can occupy different niches in different areas e.g. ravens)

-**Morphological species concept** based on unique morphological traits (are hybrids new species?)



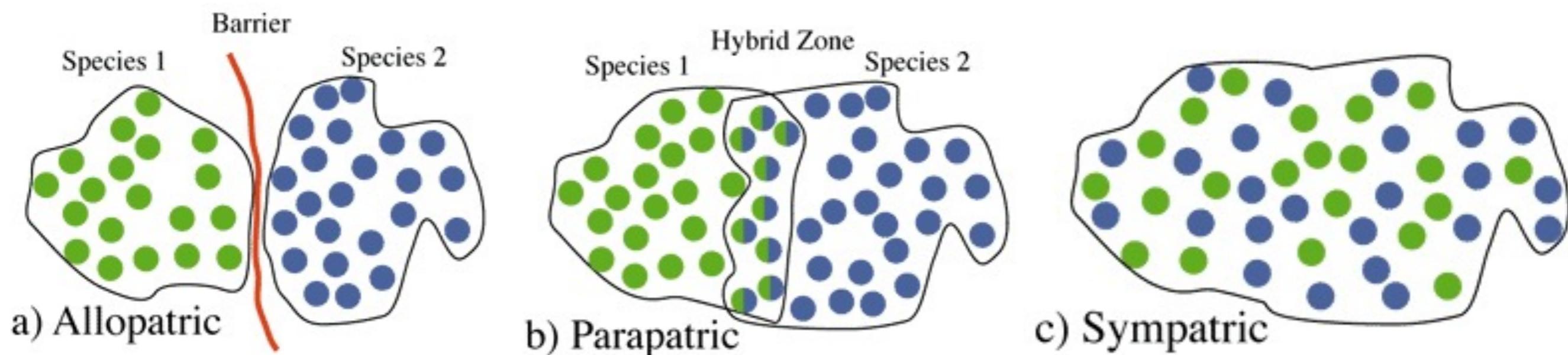
Three Traditional Models of Speciation (+polyploidy)

- Geographic relationship

1. Allopatric speciation (vicariance)

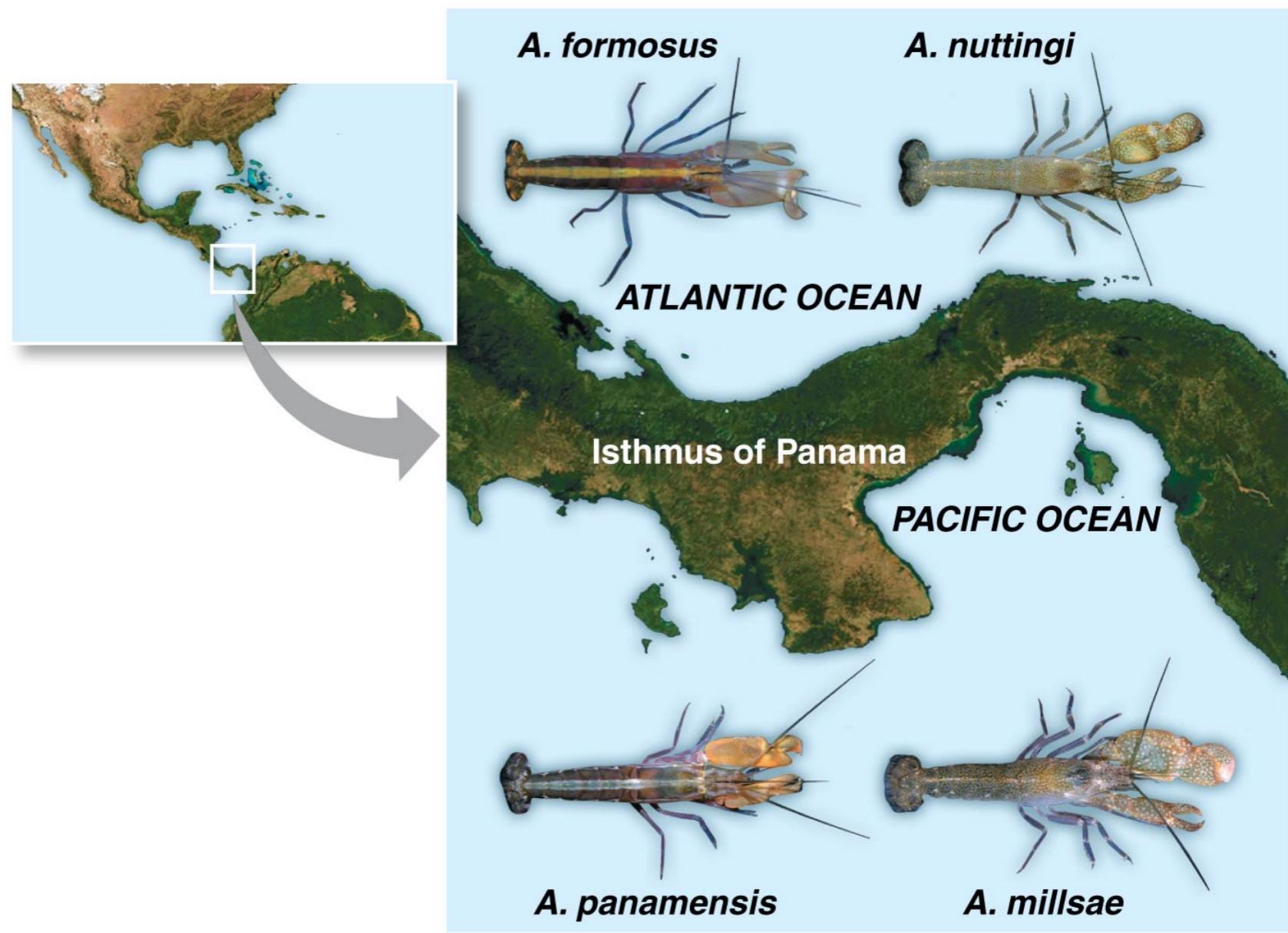
2. Parapatric speciation

3. Sympatric speciation



Allopatric speciation – Example

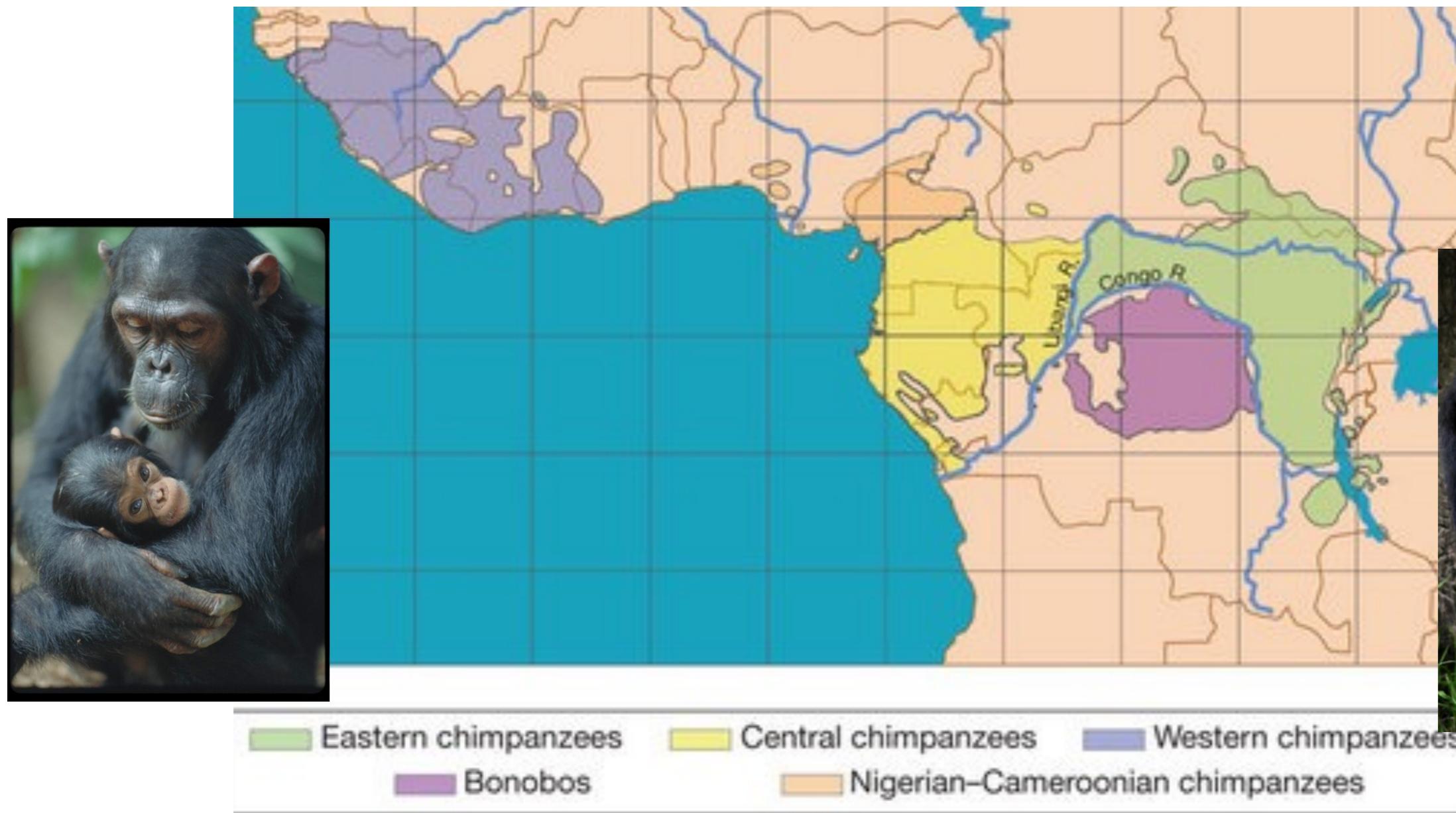
- The Isthmus of Panama formed ca 3 mill. years ago, separating **snapping shrimp** spp. on each side



Allopatric speciation –

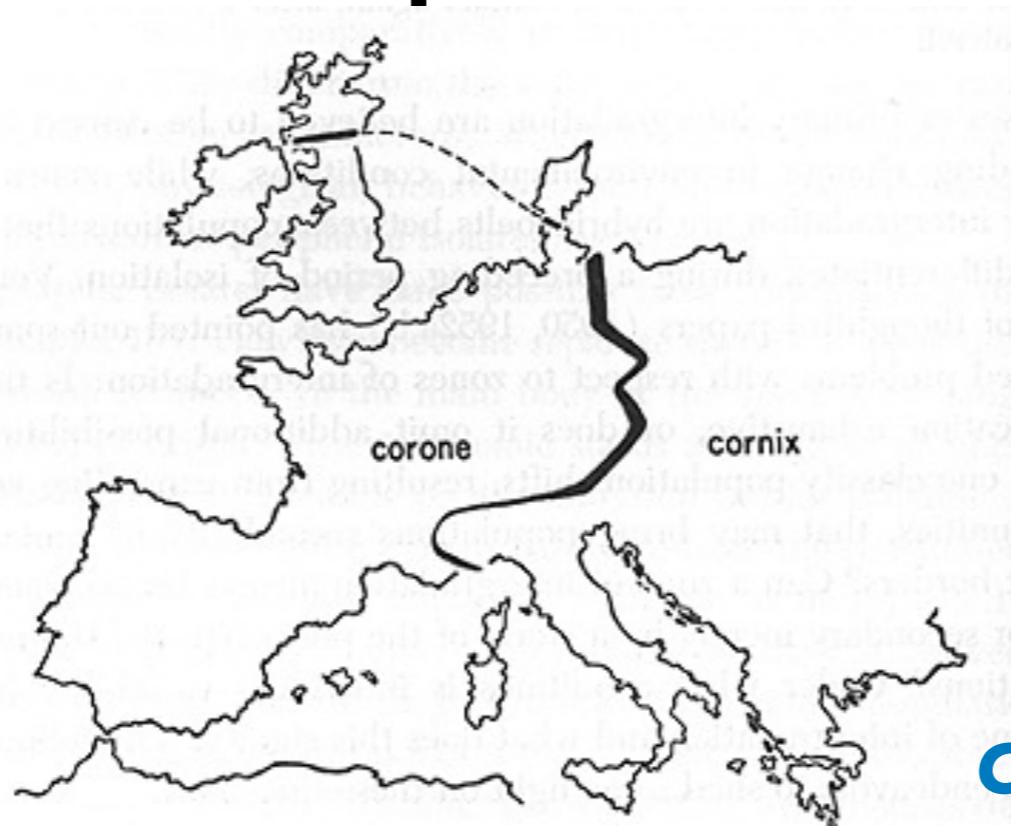
Example

- Chimpanzee / Bonobo Split ~2mya



Parapatric speciation example

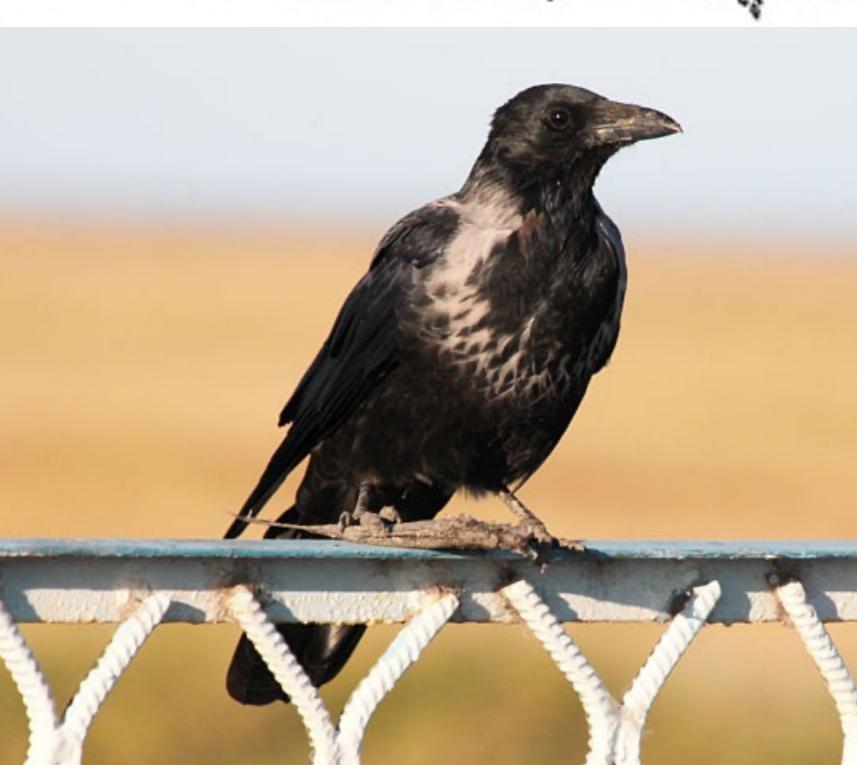
European crows



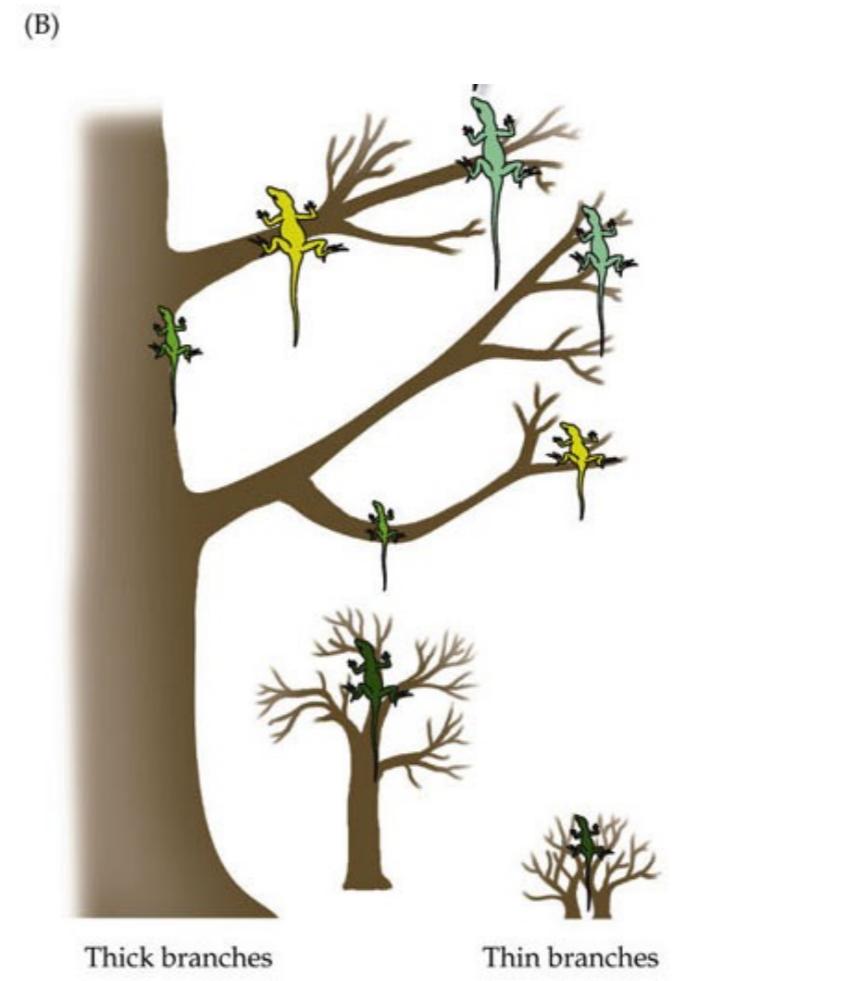
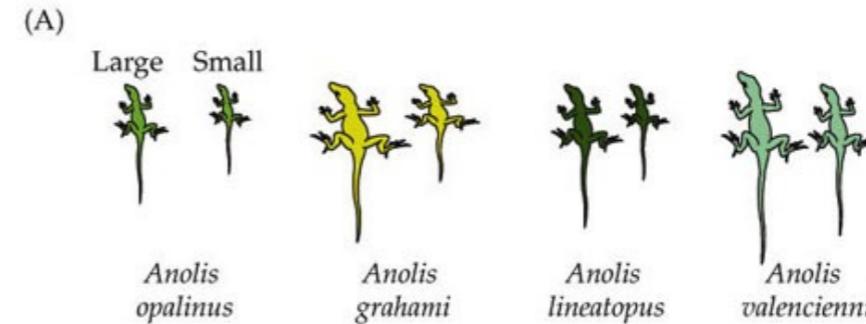
Corvus corone



Corvus cornix



Sympatric speciation example: *Anolis* lizards



Polyplody

An unusual occurrence during meiosis can sometimes cause a high number of chromosomes (usually double, from $2n$ to $4n$)
-can result in speciation –**polyplody**

- Reproductive isolation results because polyploid individuals can only interbreed with other polyploid individuals (though plants can self-pollinate)
- Common in plants, rare in animals (but the 2 gray treefrog species are an example)



Common gray treefrog (4n)



Southern (Cope's) gray treefrog (2n)

Phylogenetics & Systematics

