Species

SPECIATION

(process of the origin of species)

- Species concept
- Patterns of speciation
- Definition

1) Biological Species Concept (BSC)

Reproductive community

Reproductively isolated.
among
themselves, all members are

"Actually or Potentially Interbreeding"

2) Morphological Species Concept

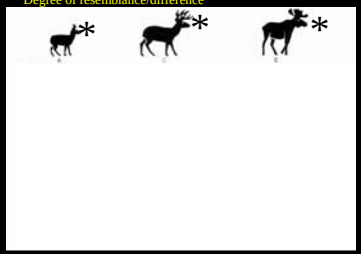
Look different

Look same

Morphospecies

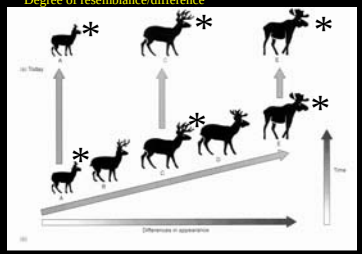
Morphological Species

Degree of resemblance/difference



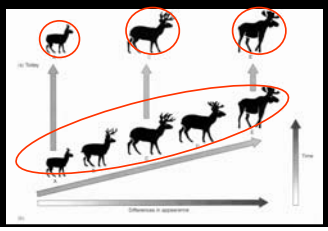
Morphological Species

Degree of resemblance/difference



3) Paleospecies Concept

Chronological series



USES

Practical

Conceptual

Visualize evolutionary processes

Biological Species Concept (BSC)

Origin of Species – Darwin

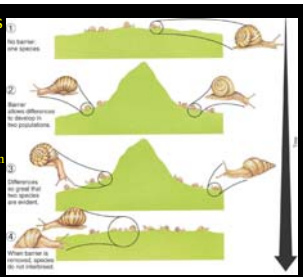
Stages

1) Single

2) Barrier

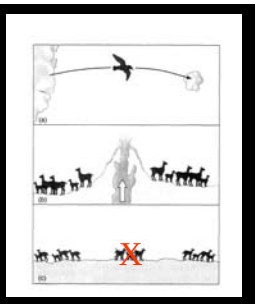
3) Differentiation

4) Disappears



Barriers

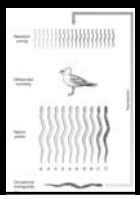
(step 2)



Most Important Step—

DIFFERENTIATION

(step 3)



RIMs

Reproductive
Isolating
Mechanisms

RIMs

Prezygotic*
Before fertilization

Postzygotic*
After fertilization

Zygote = Fertilized egg

Prezygotic

Geographic/Ecolgical

Behavioral

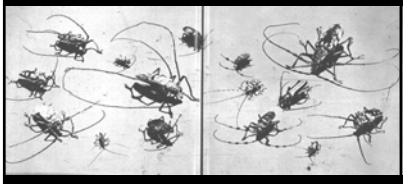
Prezygotic

Temporal

Prezygotic

Mechanical

Prezygotic

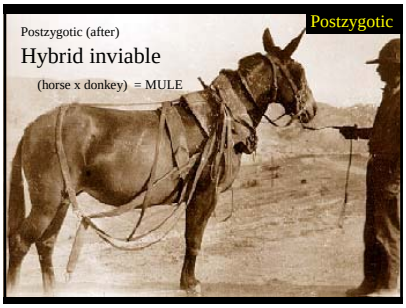


Postzygotic (after)

Hybrid inviable

(horse x donkey) = MULE

Postzygotic



RIMs

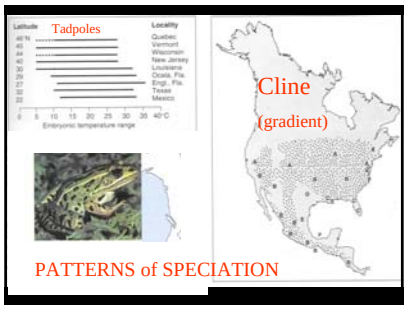
1) Passive
   if separate long time,
   incompatible
2) Active
   hybrids inviable
   select *for* isolation

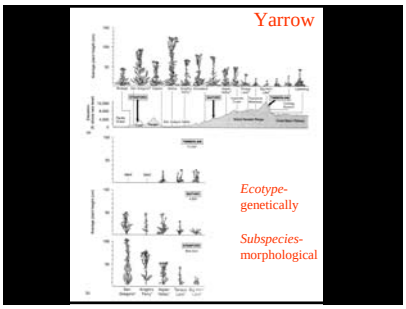
Allopatric vs. Sympatric Speciation

1) Allopatric Speciation
   reproductive isolation—not same region
2) Sympatric Speciation
   reproductive isolation—same region

Barrier ➔ Differentiation

Patterns

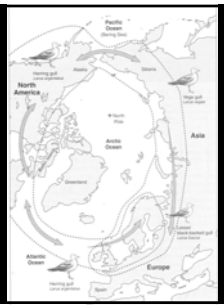


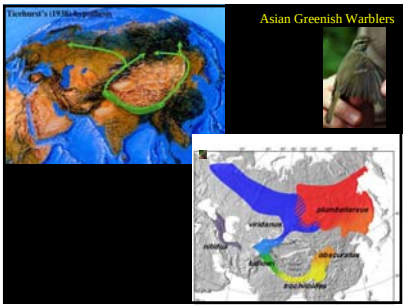


Ring Species
(rassenkreis)

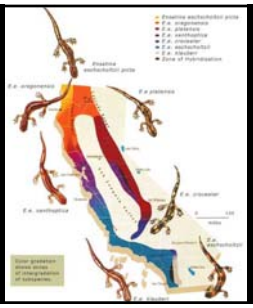
= speciation
resulting from
distance

refugia





Salamander
Ensatina



Significance of Clines and Ring Species

1) Adapt to local conditions

2) Set stage for speciation

Different habitats ➔

Different selective pressures ➔

Different traits

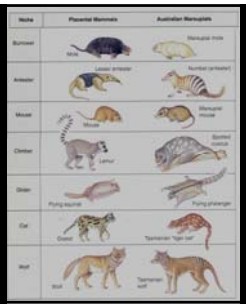
Same habitats ➔

Same selective pressures ➔

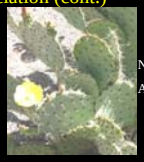
Same general traits

Parallelism
(close)

Convergence
(distant)



Speciation (cont.)



North
America

AFRICA

PATTERNS OF SPECIATION

Latitudinal Gradients

- Evolutionary time
- Climate stability
- Ecological complexity
- Productivity

Overview Speciation

1) Complexity and diversity
2) More species, more evidence of NS
3) Patterns of speciation