

# SPECIATION

## SPECIATION

Origin of new species

## SPECIES – BIOLOGICAL CONCEPT

Population or groups of populations whose members have the potential to interbreed and produce fertile offspring

## REPRODUCTIVE BARRIERS

### PREZYGOTIC:

Barriers that prevent fertilization

#### Habitat isolation

Populations can't get together

#### Behavior isolation

Different mating behavior

#### Temporal isolation

Breed or flower at different times

#### Mechanical isolation

Different anatomical structures

#### Gametic isolation

Gametes fail to fuse; don't recognize each other

**POSTZYGOTIC:**

Barriers that prevent the zygote from developing into fertile offspring

Reduced hybrid viability

Zygote fails to develop or reach sexual maturity

Reduced hybrid fertility

Hybrid sterile

Hybrid breakdown

Hybrid produces offspring but offspring not viable or not fertile

**MODES OF SPECIATION**

<b>ALLOPATRIC</b>	<b>SYMPATRIC</b>
<ul style="list-style-type: none"><li>• Populations segregated by geographic barrier</li><li>• Geographic barrier = ocean, mtn. Range, etc.</li><li>• Conditions favoring<ul style="list-style-type: none"><li>◦ Small population at fringe</li><li>◦ Better chance gene pool already different</li><li>◦ Different selection factors</li></ul></li><li>• Adaptive radiation - emergence of numerous species from common ancestor introduced into environment</li></ul>	<ul style="list-style-type: none"><li>• New species arise within range of parent species</li><li>• Reproductive isolation without geographic barrier</li><li>• How<ul style="list-style-type: none"><li>◦ Plants - polyploidy (multiple sets of chromosomes)</li><li>◦ Animals - group fixed on resources not used by parent population</li></ul></li></ul>

## GENETIC CHANGE

1. **Adaptive divergence**
  - 2 parts of population adapt to different environments
  - Each accumulates different gene pools
2. **Reproductive barriers develop**
  - Usually secondary to change in gene pool
  - May be side effect of sexual selection

## TEMPO OF SPECIATION

GRADUALISM	PUNCTUATED EQUILIBRIUM
<ul style="list-style-type: none"><li>• 1 species gradually evolves into new species</li><li>• Represents microevolution</li><li>• Big changes occur through the accumulation of small changes</li></ul>	<ul style="list-style-type: none"><li>• Long periods of stasis (equilibrium) punctuated by episodes of speciation</li><li>• Species undergo most changes when first branch from parent; then change little</li><li>• Species develop in spurts of rapid change</li><li>• Not slow and gradual</li></ul>