Speciation 2

Monday, November 21, 2016 10:36 AM

Main theme "How speciation happens "

Questions? How do populations become different species?
What eventually prevents them from interbreeding?

Morphological SC:
The concept that all individuals of a species share measurable traits that distinguish them fr
Biological SC:
The definition of species based on the ability of populations to interbreed and produce ferti
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Phylogenetic species concept:
A concept that seeks to delineate species as the smallest aggregate population that can be u

Reproductive isolation leads to speciation
They are barriers to gene flow between species

Prezygotic = barriers to meet, mate, fertilization
Postzygotic = barriers to off spring and off spring viability

once these evolve, gene flow between the two populations is restricted

over time, populations will diverge further, perhaps to the point where they cannot interbre

Prezygotic mechanisms:
Ecological isolation:
-Species live in different habitats
-A prezygotic reproductive isolating mechanism in which species that live in the same geogr
Behavioral isolation:
-A prezygotic reproductive isolating mechanism in which two species do not mate because o
ethological isolation.
-results when the signals used by one species are not recognized by another. For example, f

om individuals of other species.

le offspring.
le offspring.

united by shared derived characters.

eed

aphic region occupy different habitats

of differences in courtship behaviour; also known as

emale birds rely on the song, colour and displays of

-results when the signals used by one species are not recognized by another. For example, f
males to identify members of their own species.

Temporal isolation:

A prezygotic reproductive isolating mechanism in which species live in the same habitat but
year.

mechanical isolation:

-Differences in the structure of reproductive organs or other body parts

A prezygotic reproductive isolating mechanism caused by differences in the structure of rep
Lec ex: differences in floral structure, two species of monkey-flower attract different animal
and *cardinalis* attracts hummingbirds.

Gametic isolation:

caused by incompatibility between the sperm of one species and the eggs of another; may
A great Dane dog cannot mate with a Chihuahua

Different sperm and egg mating

Postzygotic isolation:

Hybrid inevitability: a hybrid individual has a low probability of survival to reproductive age.

Hybrid sterility: Although some hybrids between closely related species develop into healthy
functional gametes. This **hybrid sterility** often results when the parent species differ in the
cannot pair properly during meiosis

Hybrid breakdown:

hybrids are capable of reproducing, but their offspring have either reduced fertility or reduc
F2 generation is affected

geography/environment also causes populations to diverge reduces gene flow leads to repr

Types of speciation:

emale birds rely on the song, colour, and displays of

breed at different times of day or different times of

roductive organs or other body parts.
pollinators. *lewisii* attracts bumblebees,

prevent fertilization.

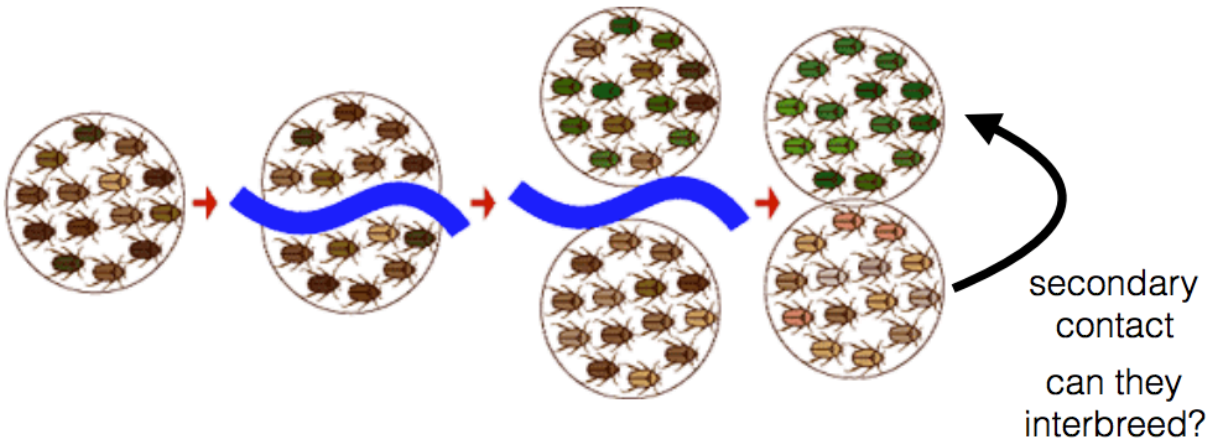
y and vigorous adults, they may not produce
number or structure of their chromosomes, which

ced viability.

oductive isolation

Allopatric speciation

two populations are geographically separated



selection, mutation, drift will results in differences accumulating

some of these will result in reproductive isolation

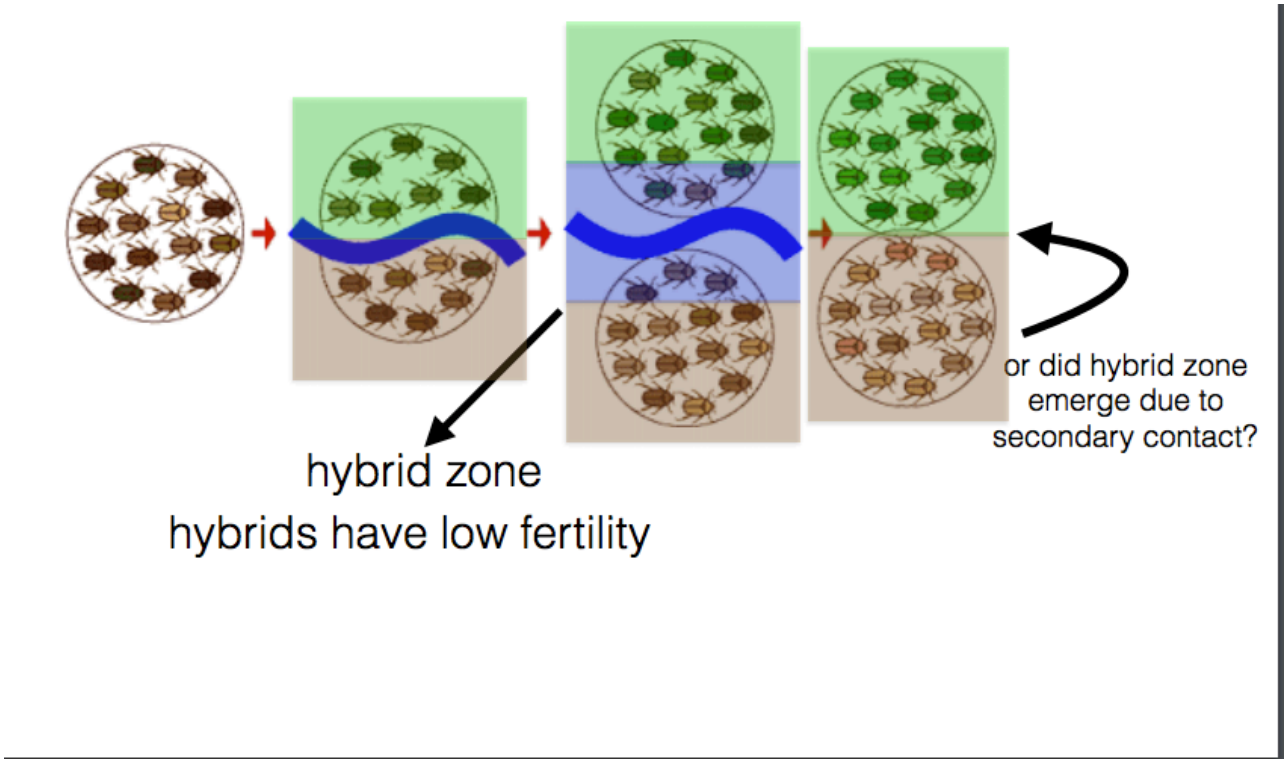
Secondary contact involves allopatric speciation
Basically allopatric speciation spits a species geographically but secondary contact is when t
population meet up again later after being split for so long

Ex.
Speciation of fruit files in hawiian acrhipelago
The filies were separated by the different islands , physical barrier

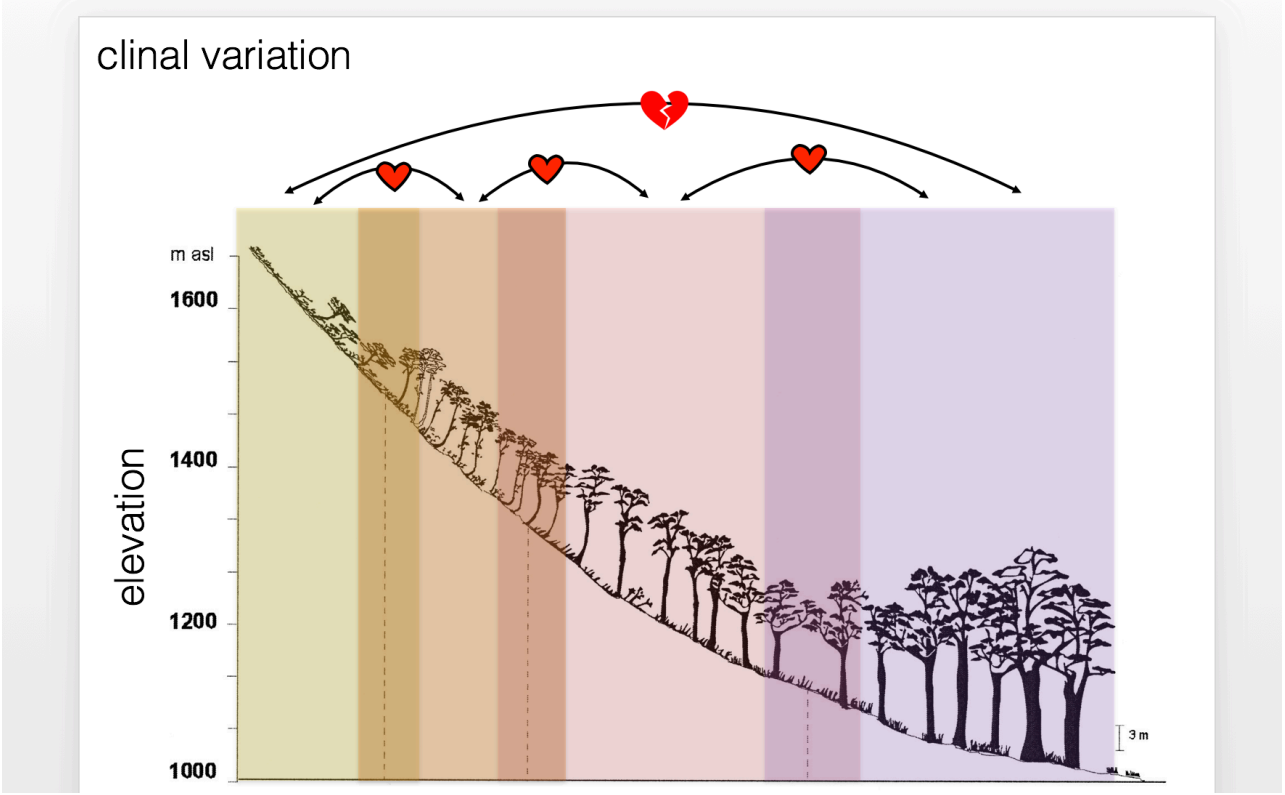
Parapatric speciation:

Parapatric speciation - between adjacent populations
populations adapt to different environmental conditions,
eventually resulting in reproductive isolation

hat geographical limitation is gone and the two



Clinal variation when a species live a habitat that really different like hot parts of a moutain
Basically the species at the polar opposite ends cannot mate which causes the speciation bu
the intermediate
population can mate



to the cold top
ut the populations that are closer together can mate ,

High Intermediate-high Intermediate-low Low

Using prezygotic and postzygotic populations will change because species are exchanging th

Ring species:
A species with a geographic distribution that forms a ring around uninhabitable terrain.

Sympatric speciation:
reproductive isolation evolves between distinct subgroups that arise within one population
the populations be either geographically or environmentally separated as their gene pools d

Sympatric speciation

populations are not geographically or environmentally separated

specializing on a particular food source

selection for specialization must be strong
to prevent gene flow and interbreeding

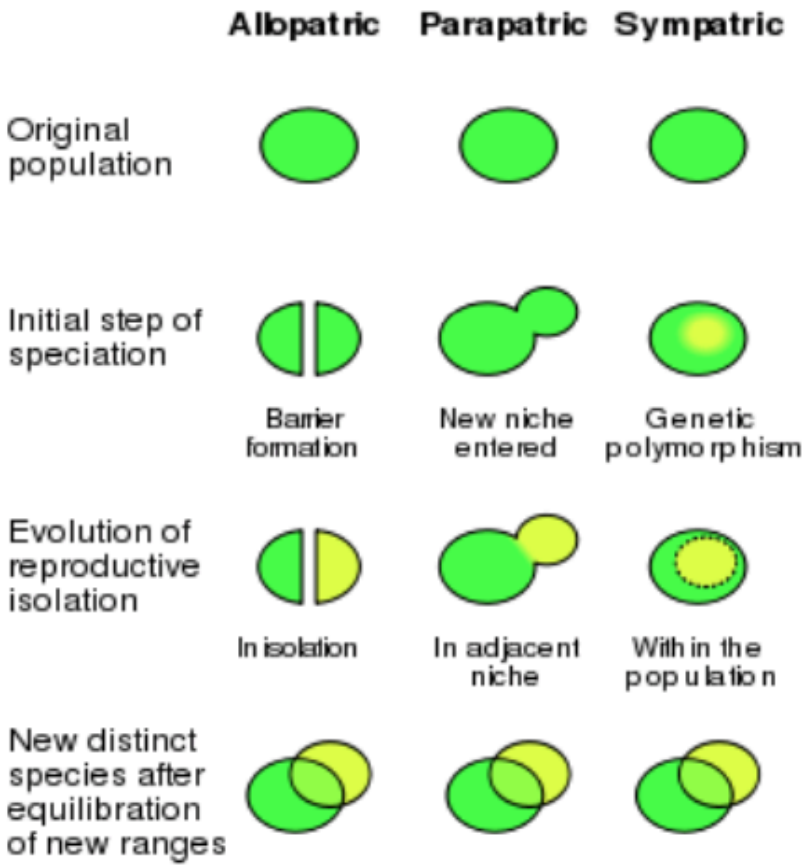
When a mutation or factor changes a population within a species forming a sub-species that

heir gene pool

. Models of sympatric speciation do not require that
liverge

t later may develop reproductive isolations

Example of all 3



populations do not immediately diverge due to reproductive isolation
barrier to gene flow first
what traits are involved?

Examples of traits involved In plants (traits changed due to gene pool change , no more gene

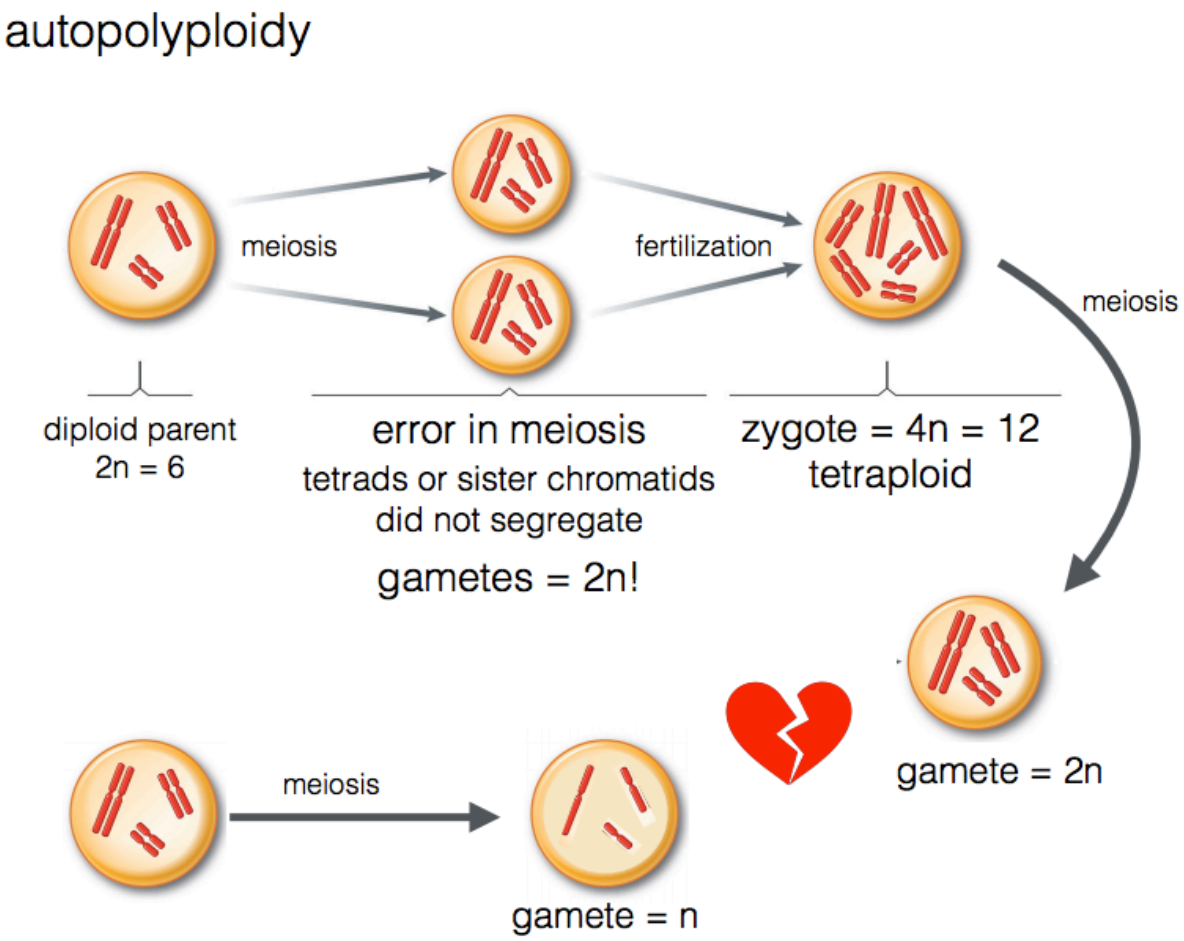
• anthocyanin pigments • carotenoid pigments in petals • flower width • petal width • nect
stalks supporting the male and female reproductive part

e flow)

ar volume • nectar concentration • lengths of the

changes in ploidy lead to rapid reproductive isolation
Side note: ploidy: the number of sets of chromosomes in a cell, or in the cells of an organism

Autopolyploid changes in the meiosis of a species
Causes tetraploids which are bad at meiosis



Microevolution:
Change in allele frequencies that occur over time within a population

Reproductive isolation

n.

Macroevolution

Large scale evolutionary pattern in the history if life major changes in species which i

is SPECIATION