

Speciation

How are species defined?

Species divergence in allopatry

Species divergence in sympatry

Reuniting

Outline

How are species defined?

- Biological species concept

- Morphological species concept

- Ecological species concept

- Phylogenetic species concept

Species divergence in allopatry

- Dispersal

- Vicariance

Species divergence in sympatry

- Disruptive selection

- Genetic incompatibility

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- Fusion

- Reinforcement

- Hybrid zones

- Exclusion

- New species

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An ancestral
population

Population
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Large ground finch



Medium ground finch

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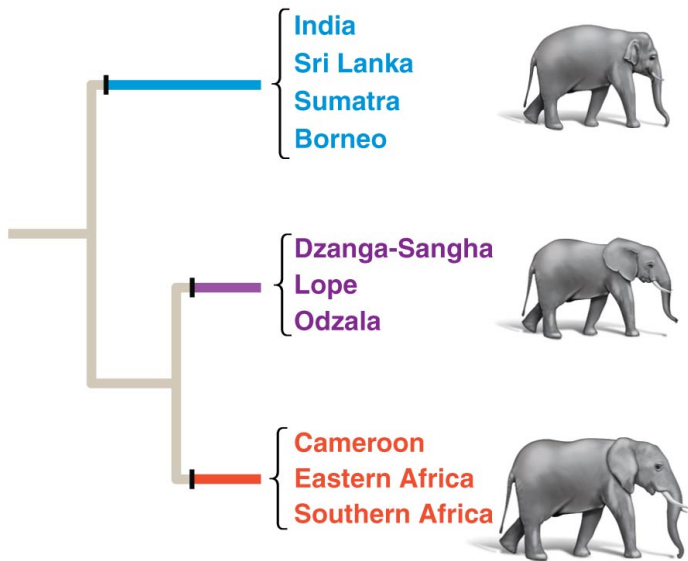
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(a) PROCESS: ALLOPATRIC SPECIATION BY DISPERSAL

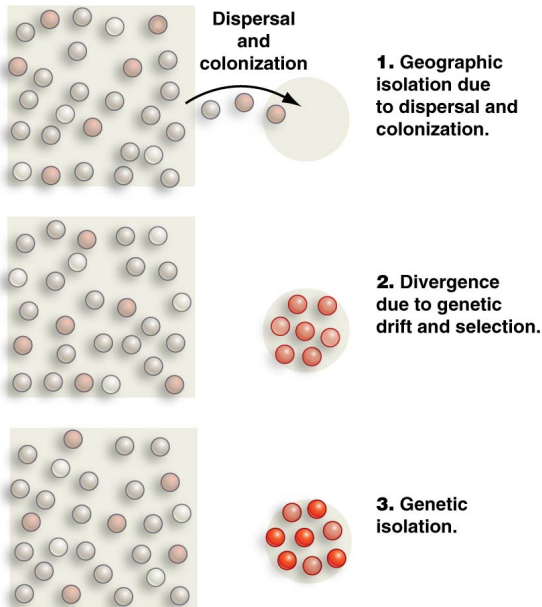
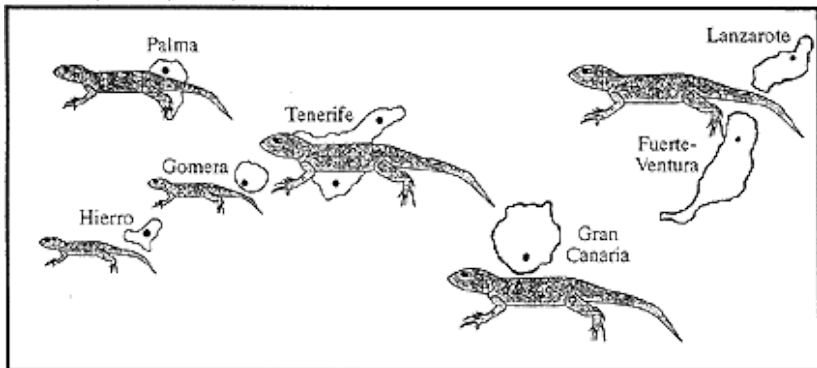


Figure 2. The relative sizes of typical lizards from each population are shown. (Redrawn from Thorpe et al., 1994.)



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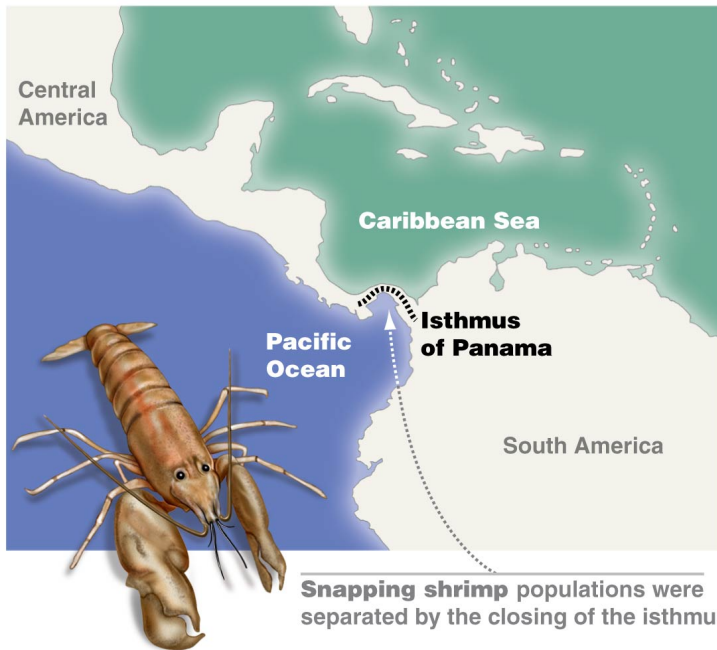
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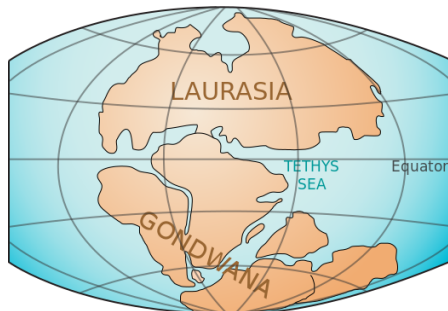
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(a) Vicariance event: The closing of the Isthmus of Panama



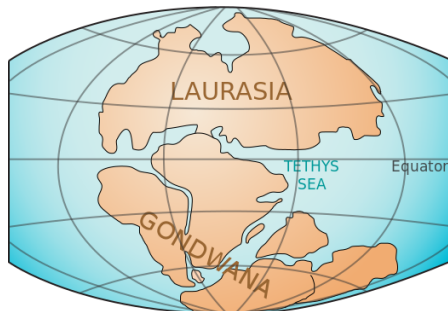
Example: ratites



TRIASSIC
200 million years ago

- ▶ The ancestors of today's ostriches, emus, etc. were isolated when the super-continent of Gondwanaland drifted apart starting about 140 million years ago

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- ▶ The ancestors of today's ostriches, emus, etc. were isolated when the super-continent of Gondwanaland drifted apart starting about 140 million years ago

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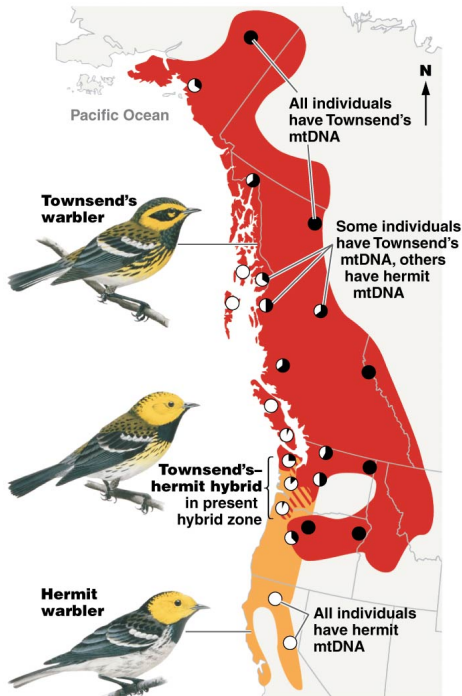
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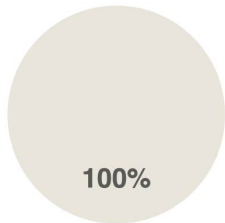
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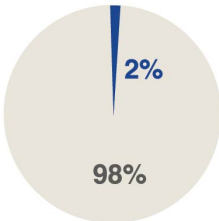
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Modern Africans



**Modern Europeans,
Asians, and Americans**

Neanderthal genes

Modern human genes

Source: Prüfer, K., et al. 2014. *Nature* 505: 43–49.

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