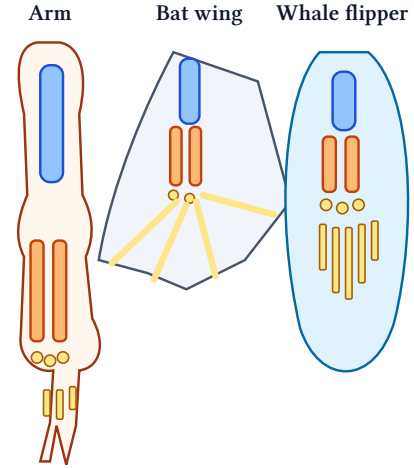
Biology 20

Unit B: Ecosystems and population change

Evidence for change and speciation

Arm and whale flipper

- Each outline shows one humerus, then a radius and an ulna, then carpals and pha-langes.
- The arm holds, the bat wing flies, and the whale flipper swims, and the bones stay in that same order.



Blue: humerus (one upper bone)
Orange: radius and ulna
(two lower bones)
Yellow: carpals and phalanges
(wrist and fingers)

Several lines, one conclusion

- Fossils show earlier forms and the order of change.
- Homologous limbs share a plan. Analogous wings share a job.
- DNA similarities line up with the groups the bones suggest.

Key terms

homologous structure

A body part with the same underlying bones or plan in different species, used for different jobs.

analogous structure

A body part with a similar job and a different underlying plan, such as an insect wing and a bird wing.

speciation

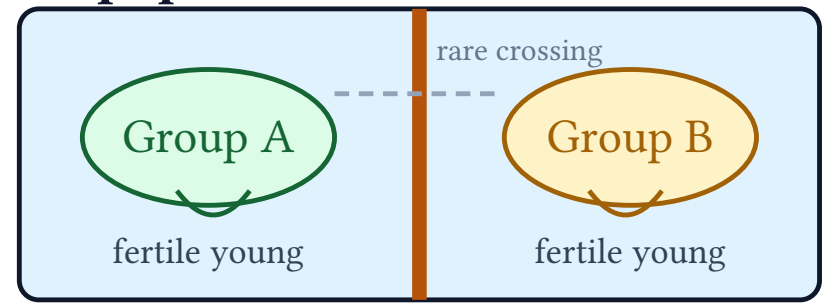
The splitting of one population into two species that produce fertile young within their own group.

reproductive isolation

A barrier that keeps two groups from producing fertile young together.

What has to happen for two species

- A barrier splits one population into two groups.
- Each group faces its own food, climate, or mates.
- Fertile young are produced within each group, and cross-group matings become rare.



Each group faces its own food, climate, or mates

A small data set

- A table of beak depth can show a shift after a dry year.
- A DNA match can show which finches are closer.



Homologous and analogous structures

- Same bone plan means homologous, even when the job differs.
- Same job with a different plan means analogous.

Bones and splits

- Define a homologous structure with the limb example.
- List the conditions for finch speciation.

Pace is the remaining question

- Gradualism and punctuated equilibrium describe tempo.
- The Burgess Shale will sit in that argument as evidence.

Image credits

Andrew Katsis, Medium ground finch on Floreana Island in the Galápagos Islands, CC BY 4.0