STICKLEBACK FISH IN BRITISH COLUMBIA

In lakes where two forms exist:
- Limnetic form
- Benthic form

In lakes with only one morph:
- Intermediate form

Observation:
In some lakes, there are two very different morphs; but in other lakes there is only one morph, which appears intermediate to the other two morphs.

Why is that?
STEP 1: Marine sticklebacks invade freshwater lakes following retreat of glaciers.

First invasion

STEP 2: The intermediate form evolves, which is a generalist, eating benthic prey & prey in the water column.

Local adaptation

STEP 3. A second marine invasion takes place. Now we have a generalist and a zooplankton specialist in coexistence.

Second invasion

STEP 4. Natural selection leads to character displacement —

- Generalist is selected to specialize more on benthic prey.
- Invader remains as specialist on zooplankton.

Character displacement

STEP 5. Modern day lakes have two different morphs (or species) at least in some lakes.
Hypothesis - Benthic and limnetic forms compete less for resources than limnetic & intermediate forms.

Exp - Place marine (limnetic form) fish in ponds with limnetic fish or Benthic fish.

Results: marine (ancestral form) grew faster in coexistence with benthic form than in coexistence with the morphologically similar limnetic form.

Character displacement reduces competition.