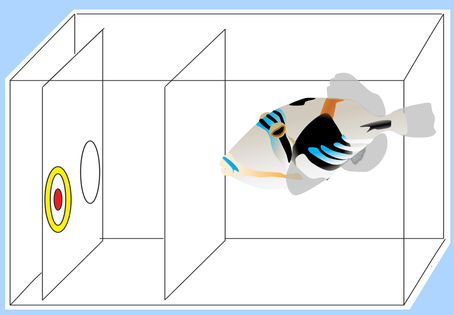
STABILIZING SELECTION ON INDIVIDUAL PATTERN ELEMENTS OF APOSEMATIC SIGNALS

Anne E. Winters[1], Naomi F. Green[1], Nerida G. Wilson[2], Martin J. How[3], Mary J. Garson[1], N. Justin Marshall[1], and Karen L. Cheney[1]
[1]The University of Queensland, [2]Western Australian Museum, [3]The University of Bristol

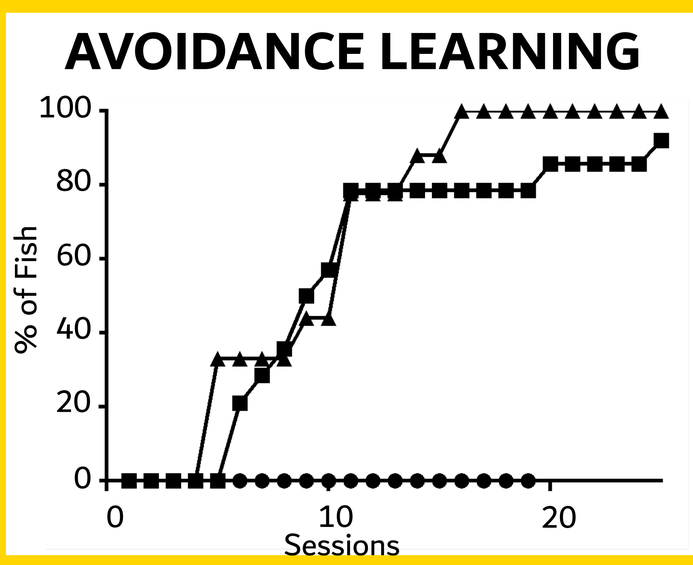
INTRO Warning signal variation is ubiquitous but paradoxical: low variability should aid recognition and learning by predators. However, variation in selection may occur if predators only learn to avoid part of the colour pattern. We used an aposematic nudibranch with a yellow rim and red spots to test this hypothesis.

BEHAVIOURAL EXPERIMENT

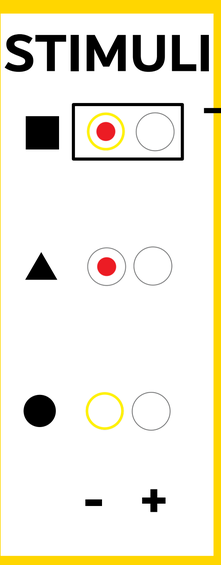
Fish offered stimuli paired with palatable (+) or unpalatable (-) food learned to avoid the yellow rim, but not the red spots.



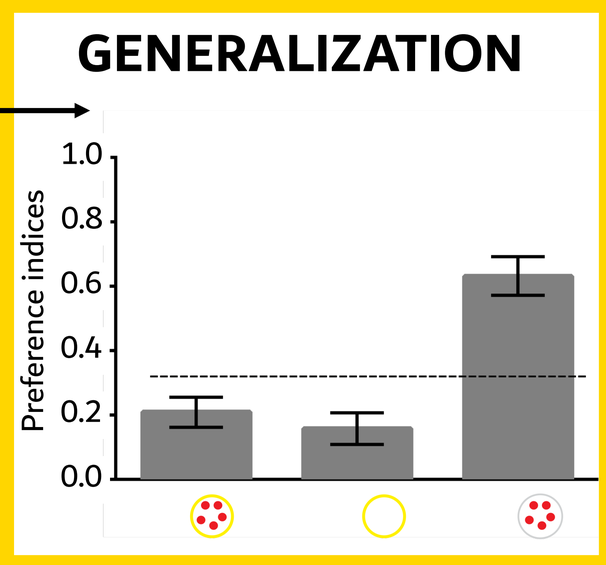
AVOIDANCE LEARNING



STIMULI



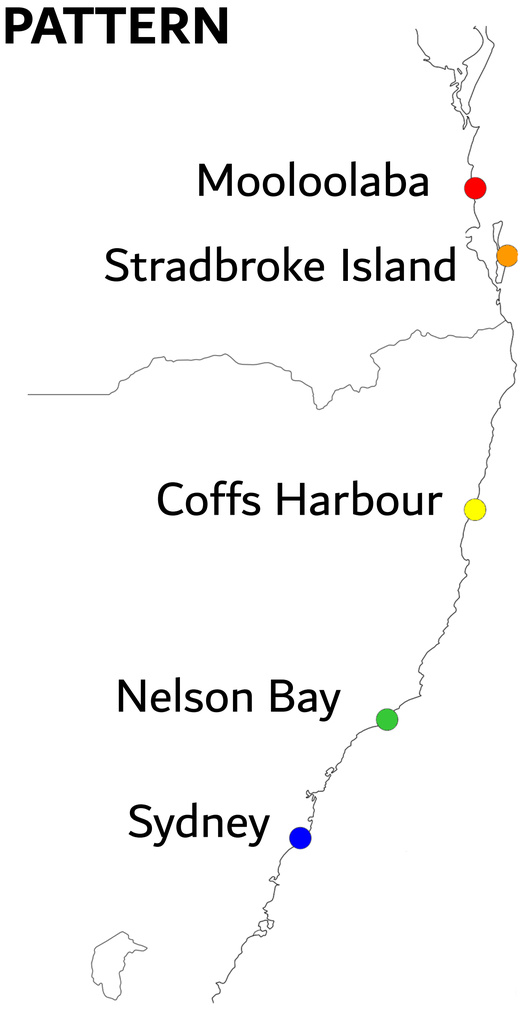
GENERALIZATION



COLOR PATTERN Using pattern geometry, we found that spot pattern varied geographically, while variation in the rim width was not funcitonally significant. Using a triggerfish vision model, the red spots were more variable in colour than the yellow rim.

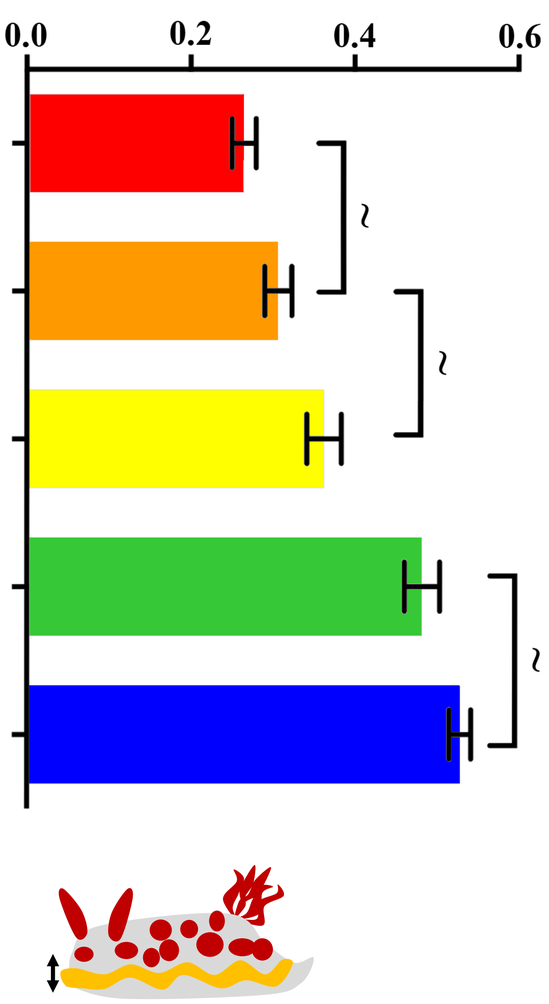
POP GEN We found strong geographic structuring, many private haplotypes, little haplotype sharing, and lack of gene flow (high F_{ST} values).

PATTERN

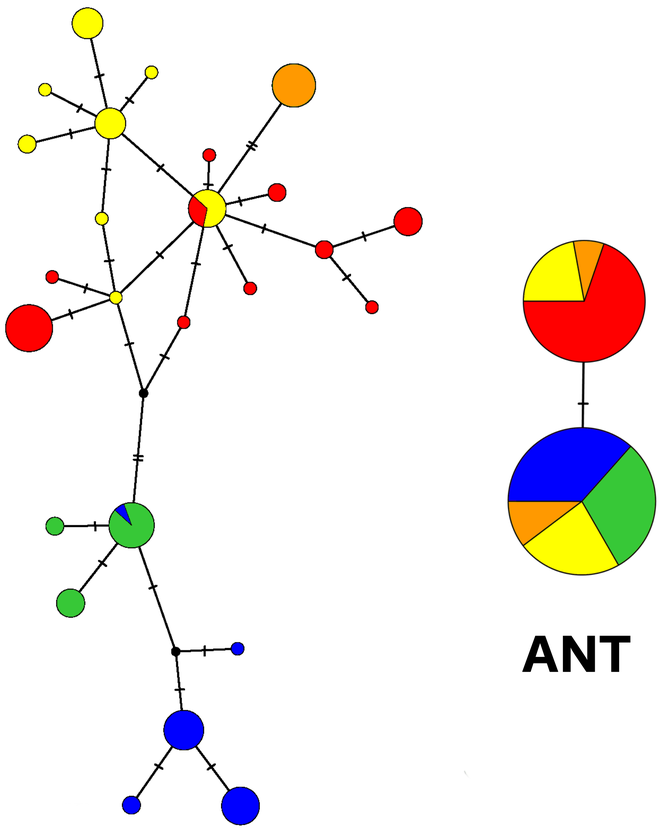


Spot FOT

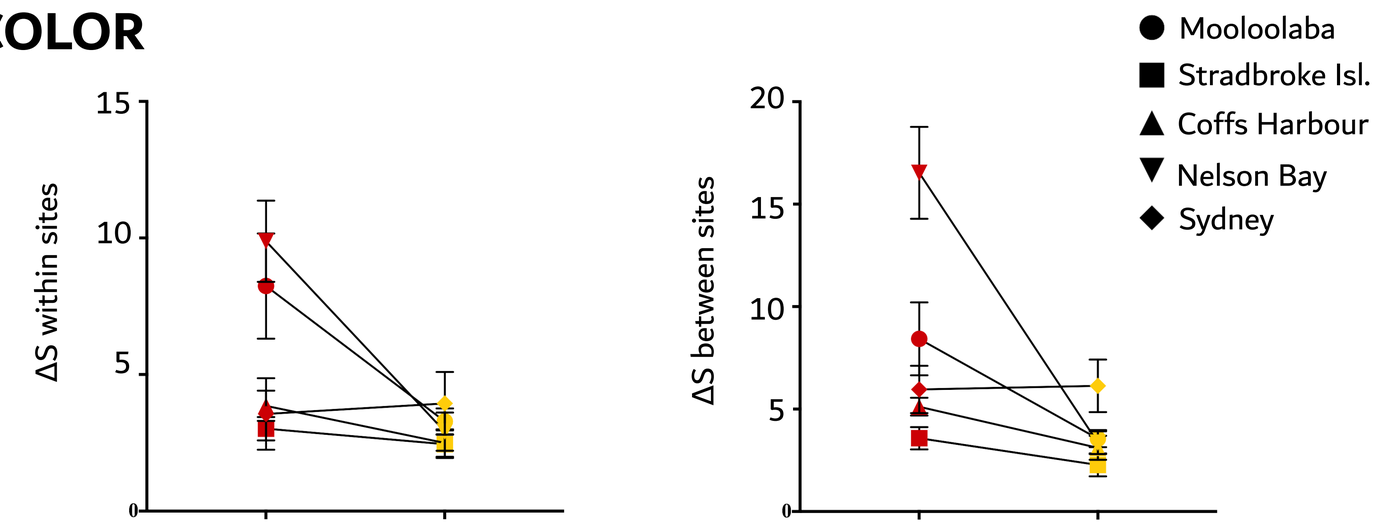
Rim Width



HAPLOTYPE NETWORKS



COLOR



CONCLUSION Colour components predators learned to avoid (yellow rim) do not vary between populations despite high genetic divergence, but other components (red spots) are highly variable. Therefore predators may exert stabilising selection on only part of the colour pattern.

For more info: anne.e.winters@jyu.fi @drannewinters

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