

Antipredator behavior

Nonsocial species may rely on crypsis, aposematism or mimicry



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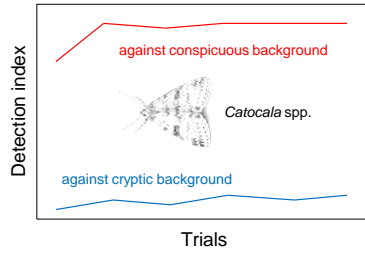


Müllerian mimicry: unpalatable species converge

Batesian mimicry: palatable mimic unpalatable model

Testing adaptations

We presume these are adaptations to predation, but how to be sure?



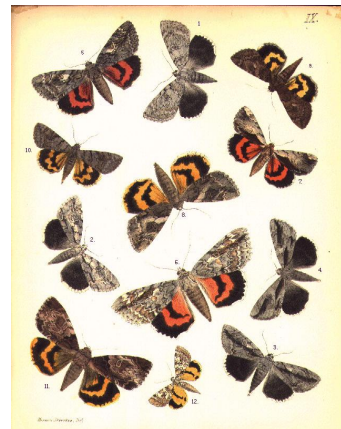
Testing adaptations

What about the aposematic hindwings of *Catocala* spp.?



Blue jays trained on:	Then presented with:	Result:
Cryptic hindwings	Aposematic hindwings	Startled!
Aposematic hindwings	Aposematic hindwings	Not startled
Aposematic hindwings	Different aposematic hindwings	Startled!

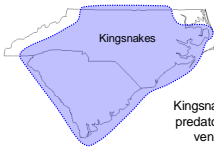
How does this affect hindwing coloration across the genus?





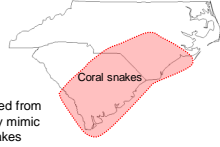
Scarlet kingsnake, *Lampropeltis triangulum*

Non-venomous
Bright coloration with striking
banding patterns
(red + black)



Eastern coral snake, *Micrurus fulvius*

Highly venomous
Bright coloration with striking
banding patterns
(red + yellow)

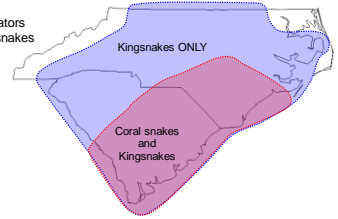


Hypothesis
Kingsnakes are protected from
predators because they mimic
venomous coral snakes



Scarlet kingsnake, *Lampropeltis triangulum*

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Scarlet kingsnake, *Lampropeltis triangulum*

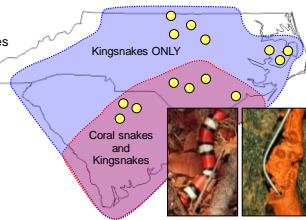
Hypothesis
Kingsnakes are protected from predators
because they mimic venomous coral snakes

Experiment
Set-up equal numbers of kingsnake
models and brown models (14 total sites)
Monitored predation on models

Prediction
Fewer attacks on kingsnakes where
coral snakes are present



Eastern coral snake, *Micrurus fulvius*

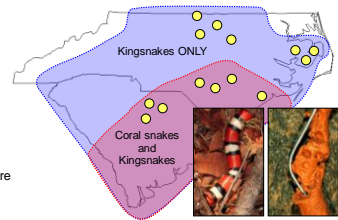


Scarlet kingsnake, *Lampropeltis triangulum*

Kingsnakes only:
83% on kingsnake models
17% on brown models

Coral and kingsnakes:
16% on kingsnake models
84% on brown models

Prediction
Fewer attacks on kingsnakes where
coral snakes are present

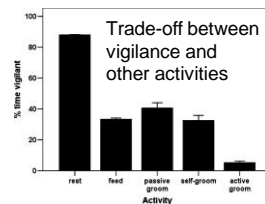


Antipredator behavior

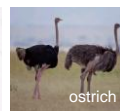
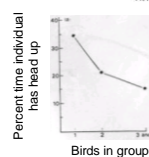


In social and nonsocial species, importance of vigilance

Vigilance and the “many eyes” hypothesis



mustached tamarin

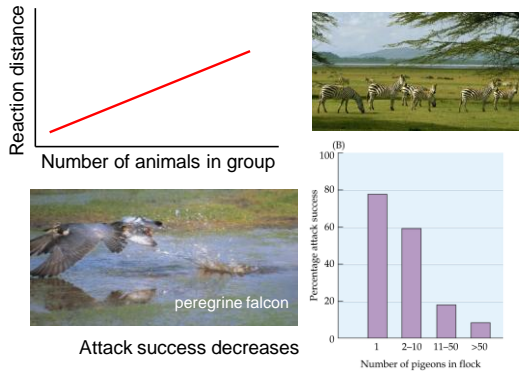


ostrich

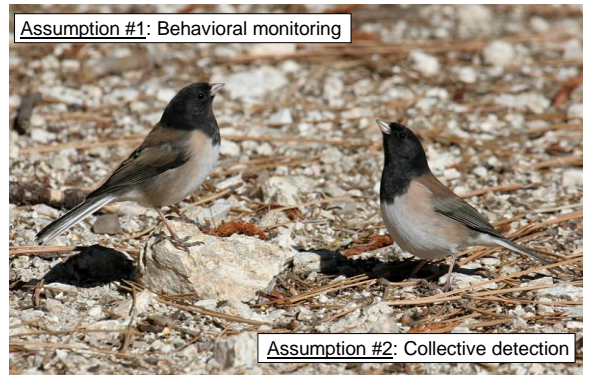
Per capita vigilance
decreases
as group size
increases

“many eyes” hypothesis

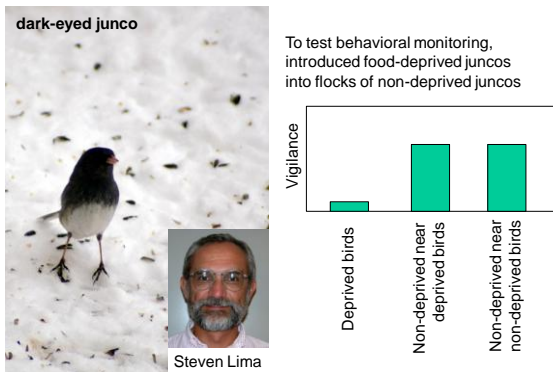
“Many eyes” hypothesis



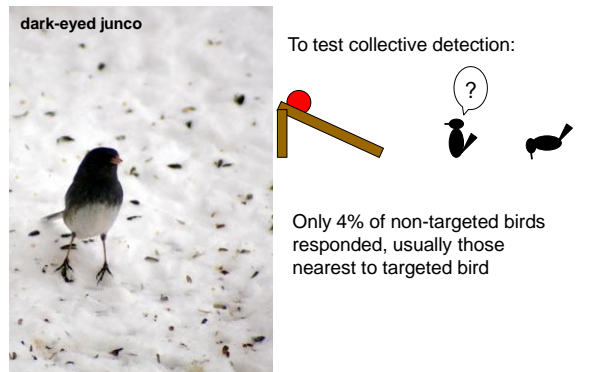
“Many eyes” hypothesis



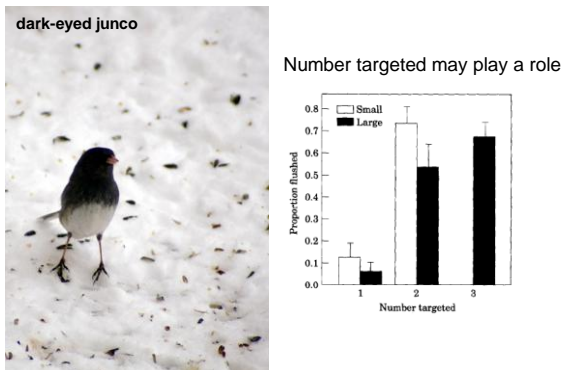
“Many eyes” hypothesis



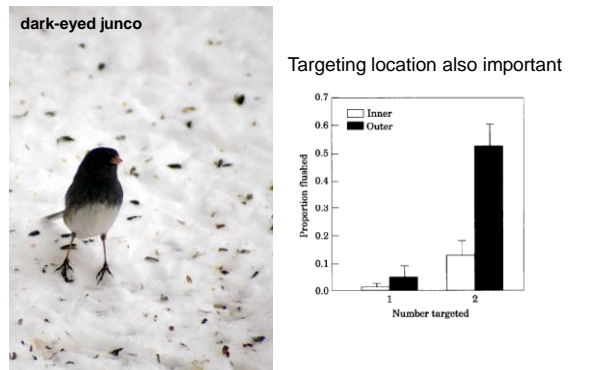
“Many eyes” hypothesis



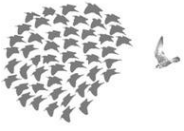
“Many eyes” hypothesis



“Many eyes” hypothesis



Group effects

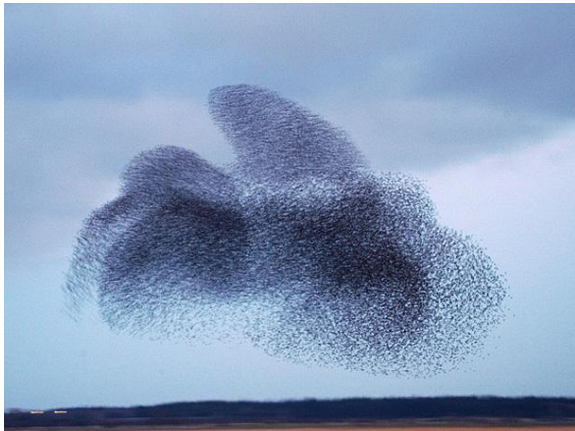
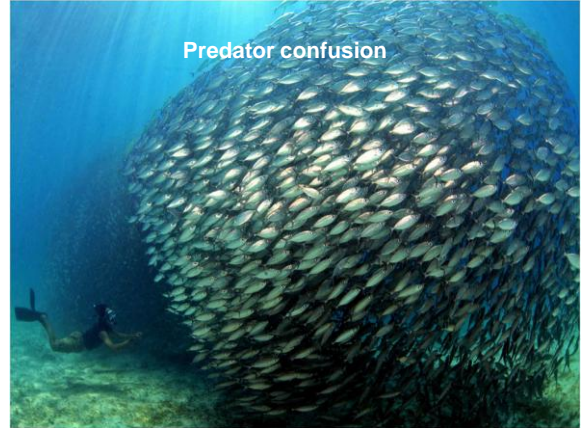


Predator confusion: predator unable to single out individual prey

Selfish herd: minimize number of search trajectories that lead to you



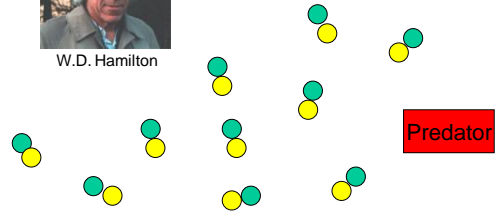
Risk dilution: decrease per capita predation risk



“Selfish herd”

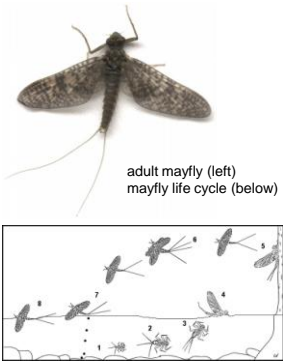


W.D. Hamilton

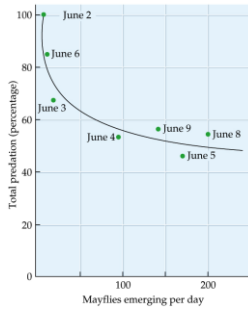


“Selfish herd”

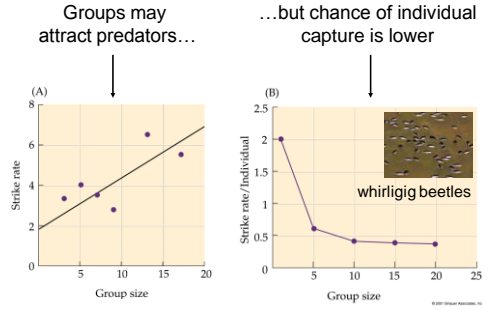




Risk dilution

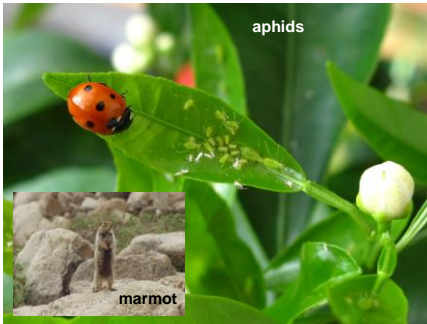


Risk dilution



Alarm signals

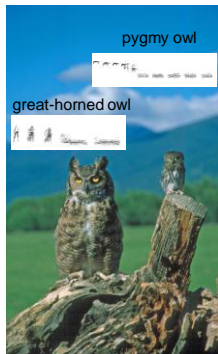
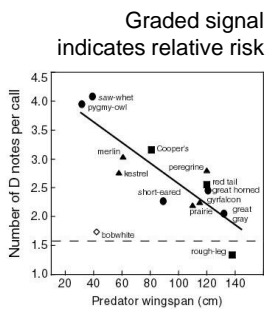
Various modalities: auditory, olfactory or visual



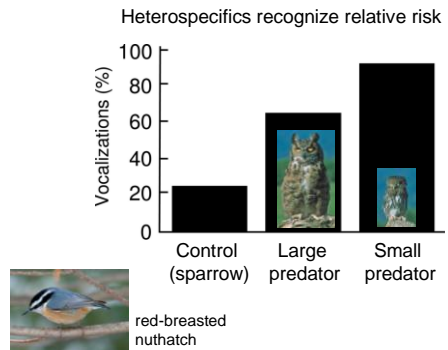
Vocal alarm signals



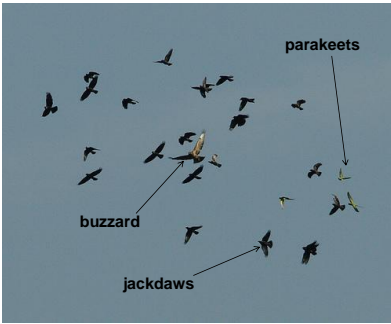
Vocal alarm signals



Vocal alarm signals

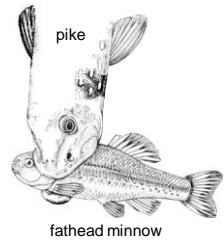
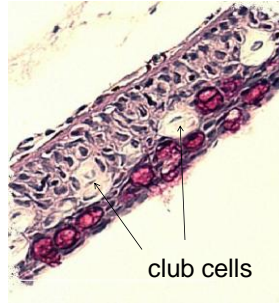


Alarm signals



Alarm calls recruit assistance, mobbing

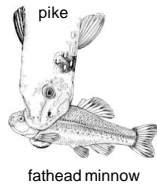
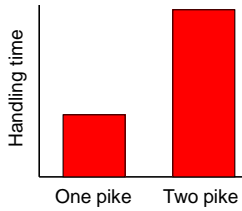
Chemical alarm signals



Who is the receiver?

Conspecifics reduce movement in response to alarm "pheromone"

Pheromone may also recruit additional predators: a potential benefit?



Visual alarm signal



Quadruped gait called stotting or pronking

Who is the receiver?

As likely to stot when alone as when in groups



No intraspecific communication function?



Signal to predator that they have been spotted?