

Insects and People - Entomology 101

Is That You? - Insect Camouflage

The Problem

Insects are the most diverse and abundant (in terms of biomass) organisms on earth. Insects are at the base of many food chains and, next to plants, may provide more food biomass than any other group of organisms.

The Solutions:

Defense

- exoskeleton
- flight
- large numbers
- "hide"
- "advertise" defensive mechanisms

Crypsis - Camouflage

- blend in with ones surroundings
 - not only morphological similarities (which are easiest to quantify) but also sound, scent, and behavioral
- contour
 - disruptive patterns
 - lateral flaps
 - orientation
 - reduction in shadow

Aposematic Coloration - "I am Dangerous"

Warning coloration - flaunt yourself

- a combination of red and black, yellow and black, or other vivid coloration (insects do not perceive reds but most mammals and birds do)
- obvious sound production
- large, conspicuous congregations

Mimicry - "I am Someone Else"

- The resemblance of one organism (the mimic) - usually in color, pattern, or behavior - to another organism (the model).
- The model should be "dangerous."
- The population of models usually outnumbers the population of mimics.

Batesian Mimicry

- Bates (1862) in the Amazon
- a palatable species evolves to resemble an unpalatable species.

- the Monarch and the Viceroy butterfly
- bees and flies
- wasps and various other insects

Mullerian Mimicry

- Muller (1879) in Brazil
- unpalatable species resemble each other
- easier for potential predators to recognize - less sacrifice

Passive and Systemic Chemical Defenses - "I am not Tasty"

- Remember allomones - interspecific chemical signals that benefit the sender?
- "borrow" a toxin from a host plant - the Monarch butterfly
- "produce your own toxins"
- in combination with aposematic coloration

Urticating hairs

- hollow hairs that contain irritating chemicals
- tarantula
- many Lepidopteran caterpillars

Reflex Bleeding

- toxic "blood" (haemolymph)
- often secreted at joints

Enteric Discharges

- regurgitation - "tobacco juice" of grasshoppers and pee of hissing cockroaches

Startle - "I am Not What You Thought"

- Flash Coloration
- Eye Spots
- eye spots to deflect danger

Attack - Turning the Tables

- A good defense - stings - as in many Hymenoptera
- Osmeterium of butterfly larvae
- Bombardier beetle
- ants spraying formic acid
- group defense