

Predation and Herbivory

Trophic cascades

HSS (Hairston, Smith and Slobodkin)

World is green

Herbivores not effective

Must be regulated from above by predation

(Top down)

Example: Urchins, Sea Otters, Seals and Killer whales

Why HSS doesn't work: plants have many defenses against herbivory, therefore regulation might actually be bottom up (generally both are important!)

Spines

Tough leaves

Difficult to digest stuff (tannins)

Toxic stuff

Alkaloids – morphine, nicotine

Terpenoids – latex, resins

Phenolics – many antimicrobial agents

“Secondary compounds” not used in metabolism

E.g., soybeans have compound that inhibits development of beetle larvae

Bamboo species produce cyanide to protect young shoots

Leads to plant-herbivore evolutionary “arms races”

Herbivory can nonetheless have a significant impact on plant biomass

Predation complicates species interactions

E.g. “Apparent competition”

Defense against predation

Be too big to eat

Be too fast to catch

Be (or look like something that is) spiny, prickly, smelly, bad tasting, toxic

Be hard to see

Mimicry systems

Batesian

Mullerian

Bright colors “aposematic”

Parasites – parasitoids – pathogens

Parasites predator like but do not kill host

Parasitoid – larvae often eat host alive

Evolution

Loss of unneeded functions

Adaptations that facilitate transmission