

SEGMENT FOUR, LECTURE SEVEN: COMMUNITY ECOLOGY

Adaptive outcomes of predation include a variety of visual shapes and colors:

- **Cryptic** coloration (Fig. 54.5a) camouflages predators and/or prey;
- **Aposematic** (Warning) Coloration (Fig. 54.5b), such as found in poisonous frogs is associated with unpalatable, toxic, or dangerous prey.
- **Müllerian mimicry** (Fig. 54.5d), such as found in many stinging insects (bees and wasps), is a general similarity in appearance between two unpalatable species. Fritz Müller proposed this in 1879.
- **Deceptive** Coloration (or Batesian mimicry) - gives a harmless animal (Fig. 54.5c—hawkmoth larva) a dangerous appearance. Henry Walter Bates (1825-1892), for whom the syndrome is named, worked with Alfred Wallace in the Amazon. Mimicry generates testable hypotheses, as in the mimicry of poisonous eastern coral snakes by nonpoisonous scarlet kingsnakes (Figs. 1.25-1.27).

Mutualism (+ / +) is an interaction causing the fitness of the interacting species to increase. Mutualism is a commonly observed outcome of **coevolution**. Members of most communities may show coevolutionary relationships, where coevolution refers to reciprocal adaptations that evolve between two species because of their interaction. Sophisticated adaptations arise, including behaviors, synchronization of life cycles and specialized structures evolve between species that interact in a mutualistic fashion.

- Plants and their pollinators— Yucca plants and their moth pollinators are especially interdependent.
- Legumes and nitrogen fixing bacteria;
- Land plants & mycorrhizal fungi;
- Tropical American bull's horn acacias & stinging (*Pseudomyrmex*) ants (Fig. 54.7);

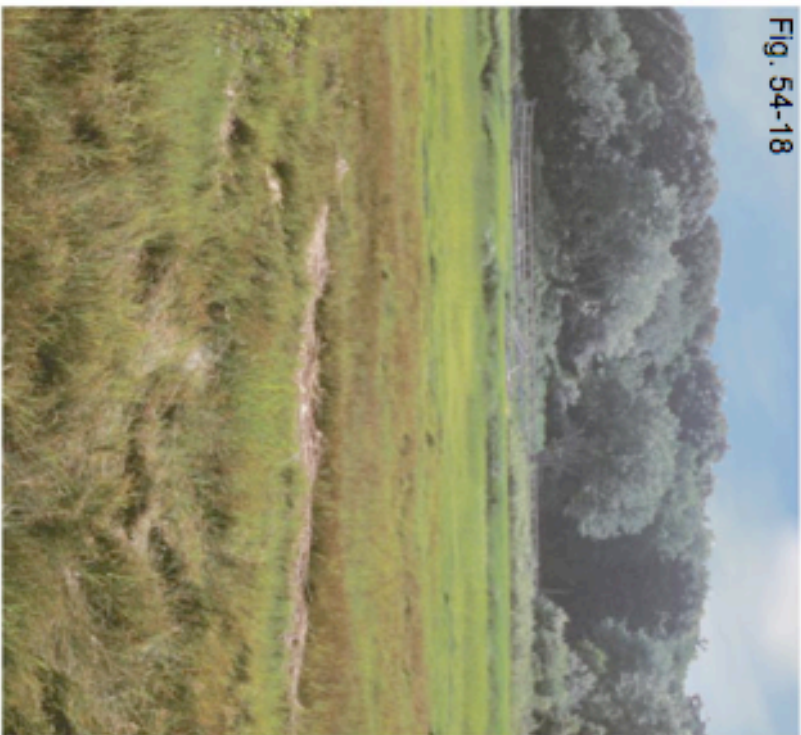
Commensalism (+ / 0) is little observed and somewhat difficult to confirm. Examples:

- 1) Cattle egrets find more insect prey around grazing water buffalo (Fig. 54.8).
- 2) Barnacles attain mobility when attached to whales.

Species that shape communities.

- 1) Overall diversity (Fig. 54.9) is composed of two elements—
 - Species richness: the number of species in a community.
 - Relative abundance: the number of individuals of each species.
- 2) Dominant species, are those with the greatest relative abundance or most biomass
- 3) Keystone species, which have a disproportionate impact on community structure because of their niches. Keystone species may be—
 - Predators (Figs. 54.15) that reduce populations of highly competitive prey;
 - Mutualists such as mycorrhizal fungi or nitrogen-fixing bacteria;
 - Producers, which form the basis of food webs such as agave plants in New World deserts.
- 4) Foundation species cause physical changes to the environment (Figs. 54.17-18) and may facilitate the survival and reproduction of other species.

Fig. 54-18



(a) Salt marsh with *Juncus* (foreground)

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Black rush plants are facilitator species in salt marshes, preventing salt buildup and oxygen depletion so that species richness is increased.

