Predator-Prey Relationships

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Predators and their prey evolve together. Over time, prey animals develop adaptations to help them avoid being eaten and predators develop strategies to make them more effective at catching their prey.

These strategies and adaptations can take many forms including camouflage, mimicry, defensive mechanisms, agility, speed, behaviors and even tool usage that make their job easier.

In nature a balance tends to exist between the predators and prey within an environment. There are a number of factors that can affect it but part of it is the birth and death rates of the predators and prey species.

Predator-Prey Cycles

It is logical to expect the two populations to fluctuate in response to the density of one another.

When the prey species is numerous, the number of predators will increase because there is more food to feed them and a higher population can be supported with available resources.

As the number of predators begins to increase, the density of the prey population will decrease in response to increased rates of predation. That results in a decrease in the

number of predators as the food resource becomes smaller which in turn decreases the rate of predation, allowing the prey species population to flourish again.

It’s a cycle. One of the best known examples of this cycle occurs with snowshoe hares and Canada lynx [1].

It is important to remember that there are other factors at work too though. These factors, such as spatial heterogeneity and prey defense mechanisms, act to stabilize the relationship, preventing the predatory or prey species from disrupting the cycle.

For example, when the prey becomes sparse, their density within a predator’s territory also becomes much less, making it harder to find prey and allowing some of the prey to survive without being completely eliminated by the predator.

Keystone Predators

Many predators dine on multiple types of prey. A keystone predator [2] is one whose presence allows multiple species that compete with one another for resources to exist in an environment. It does this because it keeps the populations of the different competitors in check through predation.

Removing the predator from the environment, often results in a rapid decrease in biodiversity as one species takes over the environment, eliminating its competitors by using up all the resources.

Invasive Species

Invasive species are ones that are introduced to an environment where they are not naturally occurring either by accident or purposefully.

Sometimes the invader is a species kept as a pet that is released into the wild. This is what has occurred with rock and Burmese pythons [3] in Florida.

Other times, it comes to the new environment via a shipment from another location or an accidental disbursement.

The invasive species disrupts the balance within an environment. It may eliminate both predators and prey within the system causing a domino effect.

A trophic cascade occurs when a number of species at all levels of the food chain within the environment are affected by the introduction.

For example, the released pythons are eating many of the top predators and their prey species. There are insufficient resources to support the other predatory species and they are being eliminated from environment along with many native prey species that are not adapted to having the python as a predator.

Predation is a key aspect of any environment and can help stabilize and influence the biodiversity within a community. When that balance is disrupted by an invasive species, it can completely change the composition of the community, often eliminating many native species that are not prepared to compete with or evade the new species.

Links
[1] http://bio.fsu.edu/~james/krebs.pdf
[2] http://education.nationalgeographic.com/education/encyclopedia/keystone-species/?ar_a=1
[3] http://www.bio.davidson.edu/people/midorcas/research/Pythons/Python.htm