

# PREDATION

## Definition:

It is a biological interaction where one organism kills and eats another organism. This is a kind of feeding behaviour. Animal which attacks is called as predator while the animal which act as victim and being killed in the process is called as prey.

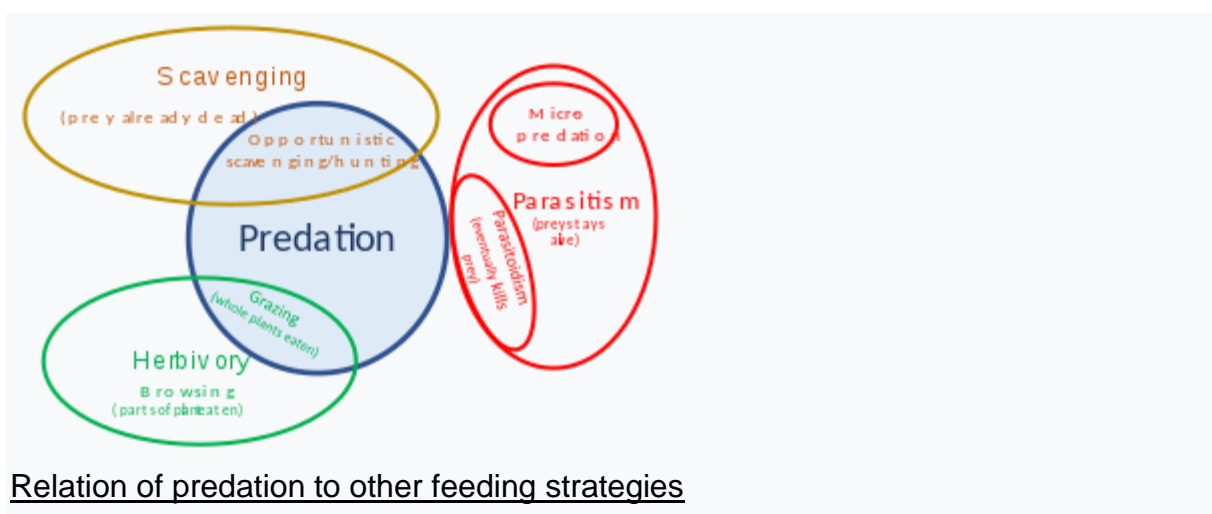
## Introduction:

In general, nature has equipped and adapted the predators with acute senses such as vision, hearing, or smell.

Many predatory animals, both vertebrate and invertebrate, have sharp claws or jaws to grip, kill, and cut up their prey. Other adaptations include stealth and aggressive mimicry that improve hunting efficiency.

Predation has a powerful selective effect on prey, and the prey develop antipredator adaptations such as warning coloration, alarm calls and other signals, camouflage, mimicry of well-defended species, and defensive spines and chemicals. Sometimes predator and prey find themselves in an evolutionary arms race, a cycle of adaptations and counter-adaptations. Predation has been a major driver of evolution since at least the Cambrian period.

At the most basic level, predators kill and eat other organisms. However, the concept of predation is broad, defined differently in different contexts, and includes a wide variety of feeding methods; and some relationships that result in the prey's death are not generally called predation. A parasitoid, such as an ichneumon wasp, lays its eggs in or on its host; the eggs hatch into larvae, which eat the host, and it inevitably dies. Zoologists generally call this a form of parasitism, though conventionally parasites are thought not to kill their hosts. A predator can be defined to differ from a parasitoid in that it has many prey, captured over its lifetime, where a parasitoid's larva has just one, or at least has its food supply provisioned for it on just one occasion.



## Relation of predation to other feeding strategies

There are other difficult and borderline cases. Micropredators are small animals that, like predators, feed entirely on other organisms; they include fleas and mosquitoes that consume blood from living animals, and aphids that consume sap from living plants. However, since they typically do not kill their hosts,

they are now often thought of as parasites. Animals that graze on phytoplankton or mats of microbes are predators, as they consume and kill their food organisms; but herbivores that browse leaves are not, as their food plants usually survive the assault.<sup>[5]</sup> When animals eat seeds (seed predation or granivory) or eggs (egg predation), they are consuming entire living organisms, which by definition makes them predators.

Scavengers, organisms that only eat organisms found already dead, are not predators, but many predators such as the jackal and the hyena scavenge when the opportunity arises. Among invertebrates, social wasps (yellowjackets) are both hunters and scavengers of other insects.

### **Examples:**

While examples of predators among mammals and birds are well known, predators can be found in a broad range of taxa including arthropods. They are common among insects, including mantids, dragonflies, lacewings and scorpionflies. In some species such as the alderfly, only the larvae are predatory (the adults do not eat). Spiders are predatory, as well as other terrestrial invertebrates such as scorpions; centipedes; some mites, snails and slugs; nematodes; and planarian worms. In marine environments, most cnidarians (e.g., jellyfish, hydroids), ctenophora (comb jellies), echinoderms (e.g., sea stars, sea urchins, sand dollars, and sea cucumbers) and flatworms are predatory. Among crustaceans, lobsters, crabs, shrimps and barnacles are predators, and in turn crustaceans are preyed on by nearly all cephalopods (including octopuses, squid and cuttlefish).

Paramecium, a predatory ciliate, feeding on bacteria

Seed predation is restricted to mammals, birds, and insects and is found in almost all terrestrial ecosystems. Egg predation includes both specialist egg predators such as some colubrid snakes and generalists such as foxes and badgers that opportunistically take eggs when they find them.

Some plants, like the pitcher plant, the Venus fly trap and the sundew, are carnivorous and consume insects. Methods of predation by plants varies greatly but often involves a food trap, mechanical stimulation, and electrical impulses to eventually catch and consume its prey. Some carnivorous fungi catch nematodes using either active traps in the form of constricting rings, or passive traps with adhesive structures.

Many species of protozoa (eukaryotes) and bacteria (prokaryotes) prey on other microorganisms; the feeding mode is evidently ancient, and evolved many times in both groups. Among freshwater and marine zooplankton, whether single-celled or multi-cellular, predatory grazing on phytoplankton and smaller zooplankton is common, and found in many species of nanoflagellates, dinoflagellates, ciliates, rotifers, a diverse range of meroplankton animal larvae, and two groups of crustaceans, namely copepods and cladocerans.

Predators have a choice of search modes ranging from sit-and-wait to active or widely foraging. The sit-and-wait method is most suitable if the prey are dense and mobile, and the predator has low energy requirements. Wide foraging expends more energy, and is used when prey is sedentary or sparsely distributed. There is a continuum of search modes with intervals between periods of movement ranging from seconds to

months. Sharks, sunfish, Insectivorous birds and shrews are almost always moving while web-building spiders, aquatic invertebrates, praying mantises and kestrels rarely move. In between, plovers and other shorebirds, freshwater fish including crappies, and the larvae of coccinellid beetles (ladybirds), alternate between actively searching and scanning the environment.



The black-browed albatross regularly flies hundreds of kilometres across the nearly empty ocean to find patches of food.

Prey distributions are often clumped, and predators respond by looking for patches where prey is dense and then searching within patches. Where food is found in patches, such as rare shoals of fish in a nearly empty ocean, the search stage requires the predator to travel for a substantial time, and to expend a significant amount of energy, to locate each food patch. For example, the black-browed albatross regularly makes foraging flights to a range of around 700 kilometres (430 miles), up to a maximum foraging range of 3,000 kilometres (1,860 miles) for breeding birds gathering food for their young. With static prey, some predators can learn suitable patch locations and return to them at intervals to feed. The optimal foraging strategy for search has been modelled using the marginal value theorem.

Search patterns often appear random. One such is the Lévy walk, that tends to involve clusters of short steps with occasional long steps. It is a good fit to the behaviour of a wide variety of organisms including bacteria, honeybees, sharks and human hunter-gatherers.



### **Capture:**

To capture prey, predators have a spectrum of pursuit modes that range from overt chase (pursuit predation) to a sudden strike on nearby prey (ambush predation). Another strategy in between ambush and pursuit is ballistic interception, where a predator observes and predicts a prey's motion and then launches its attack accordingly.



**Western green lizard ambushes its grasshopper prey.**



**A trapdoor spider waiting in its burrow to ambush its prey**

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