

Essential Carnivorous Plants

Most plants absorb nitrogen from the soil through their roots. But carnivorous plants absorb nitrogen from their animal prey through leaves specially modified as traps. Because insects are one of the most common prey items for most carnivorous plants, they are sometimes called insectivorous plants.

What makes a carnivorous plant?

- Most carnivorous species are green plants that make food through photosynthesis (using chlorophyll to convert sunlight, water, and carbon dioxide into sugar). Consuming animals provides nitrogen and other minerals necessary for this process.
- Using enzymes or bacteria, carnivorous plants digest their prey through a process similar to digestion in animals. The end products, particularly nitrogenous compounds and salts, are absorbed by the plants to enable their survival under otherwise marginal or hostile environmental conditions.

Natural History

- Carnivory in plants has evolved independently about six times across several families and orders. The more than 600 known species of carnivorous plants constitute a very diverse group, in some cases having little more in common than their carnivorous habit.
- The most common habitat for these plants is in bogs and fens, where nutrient concentrations (particularly nitrogen) are low but water and sunshine seasonally abundant.
- On the whole, carnivorous plants are relatively small, but large varieties also exist.
- Carnivorous plants are especially adapted for capturing and digesting various invertebrates, and occasionally even small frogs and mammals.

Traps

- The conspicuous trapping mechanism, which is always a modified leaf, draws special attention to these plants.
 - Pitfall traps, such as those found in pitcher plants, are among the most common types of traps and employ a hollow, lidded leaf filled with liquid to passively collect and digest prey.
 - Flypaper (or sticky or adhesive) traps can be active or passive and rely on sticky mucilage, either directly on the leaf surface (butterworts) or on gland-tipped hairs (sundews), to capture prey.
 - Snap traps (or steel traps), such as those of the Venus flytrap (*Dionaea muscipula*) and waterwheel plant are hinged leaves that snap shut when trigger hairs are touched. They use rapid leaf movements to actively ensnare insects.

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- Bladder traps (or suction traps) unique to bladderworts (genus *Utricularia*), are highly modified leaves in the shape of a bladder with a hinged door lined with trigger hairs and actively suck in small organisms using a partial vacuum.
- Lobster-pot traps, found predominantly in corkscrew plants (genus *Genlisea*), are twisted tubular channels lined with hairs and glands and employ downward-pointing hairs to force prey deeper into the trap.
- Pitfall traps evolved independently in four plant groups and sticky traps in at least three. These are examples of convergent evolution. In contrast, the snap trap and lobster-pot traps evolved only once among carnivorous plants.
- Digestion of the prey can take several days. The soft, inner parts of the insect are digested, but not the tough, outer part called the exoskeleton.
 - In flytraps, at the end of the digestive process, which can take from five to twelve days, the trap reabsorbs the digestive fluid and then reopens. The time it takes for the trap to reopen depends on the size of the insect, temperature, the age of the trap, and the number of times it has gone through this process.
 - In pitcher plants, rainwater inside a pitcher plant hosts a complex system of aquatic life, including mosquito, fly, and midge larvae; mites; rotifers; copepods; nematodes; and multicellular algae. These tiny organisms are crucial to the pitcher plant's ability to process food. They create what scientists call a 'processing chain': when a bug drowns in the pitcher's toxic rainwater, midge larvae swim up and shred it to smaller pieces, bacteria eat the shredded pieces, rotifers eat the bacteria, and the pitcher plant absorbs the rotifers' waste.

Reproduction

- Mature carnivorous plants may produce flowers on a tall stalk far above the leaves. Flowers must be far away from the traps so insects pollinating the flowers do not get trapped.

Human History

- In the wild, most carnivorous plants are relatively rare.
- Habitat destruction and over collection are two of the greatest conservation threats to carnivorous plants. If you are interested in growing carnivorous plants in your home or classroom, purchase the plants from a reputable grower who uses tissue culture or vegetative means to grow the plant, or starts them from seeds.

https://botany.org/Carnivorous_Plants/

<https://www.britannica.com/plant/carnivorous-plant>

<https://www.sciencedaily.com/releases/2013/04/130402182653.htm>

<https://botany.org/bsa/misc/carn.html>