

## **Carnivorous Plants**

by Kathi Joye

Carnivorous plants, with their alien-like appearances, outlandish names and devious stabs at survival, are intriguing to people world-wide, particularly kids. Whenever I work with young students on a plant unit in science, there is that inevitable moment when they jump shift to the topic of carnivorous plants pondering their uniqueness. Why do they devour insects? Why are they considered plants if they eat meat like animals? How do they catch their prey? Can I grow them at home? Perhaps you too would like a better understanding of carnivorous plants. The science begins with nitrogen.

Nitrogen is a necessary element in the soil and is absorbed by plant roots. It is an essential building block for proteins, enzymes, chlorophyll and nucleic acids like DNA. It is also critical for photosynthetic and metabolic reactions needed for growth, development and survival. Deficiencies in nitrogen are characterized by yellowish leaf color, arrested growth and early death. As nitrogen is low in most California soils, agriculturalists and gardeners add fertilizer and compost to soil to enhance its nitrogen content or to stimulate the growth of soil microbes that help convert nitrogen into forms used by plants.

Carnivorous plants grow in acidic bog-like soils that are quite poor in mineral salts and other elements, particularly nitrogen. These essential compounds are leached out of the ground by the high water content. Most plants could not survive in this type of environment but carnivorous plants, over time, have independently adapted different strategies to compensate for the deficient soil. Each of the carnivorous plants has modified leaf structures to capture animals (insects, frogs, snakes and even small monkeys!) and break down their bodies to extract the desperately needed nitrogen and other elements. Once they obtain the nitrogen, the carnivorous plants are able to build enzymes, chlorophyll and other structures and carry out photosynthesis to make their own food. This keeps them firmly in the plant kingdom. And, unlike carnivorous animals, carnivorous plants do not capture prey for food energy... but just for the required building blocks.

The leaf alterations used by carnivorous plants to trap insects and other small animals include pitfall, snap, fly paper and suction traps. Pitcher plants have a pitfall trap in which leaves are folded around a pool of enzymatic juices and lined with miniscule hairs that prevent prey from crawling out. The most famous snap trap is the Venus fly trap which has tiny trigger hairs on hinged leaves that close in seconds when touched twice in less than 30 seconds. Carnivorous plants, like the sundew, have leaves that contain glands that exude a sticky substance which makes the leaves more like adhesive tape but worse because the glue also contains digestive enzymes. A bladderwort has bladder-shaped leaves with a trap door and minute hairs which are the basis for a suction trap. The trap is set when water is pumped outside the bladder creating low pressure inside; the trap is released when an insect touches the hairs, the door opens and the water rushes into the bladder forcing the insect along with it.

There were once over 600 different species of carnivorous plants but most are now extinct. They have been found on most continents and can still be found in every US state; however, their populations have dwindled to about 3-5% of their original numbers. The decrease in carnivorous plants is due to loss of habitat, acid rain, and over-collecting by humans; poaching is now the biggest threat to the existence of native carnivorous plants.

If you are interested in growing carnivorous plants at home, there are a few important things to keep in mind. Be sure to buy them from a reputable nursery that does not buy from poachers or collect specimens from their native habitats. Check the health of the plant that you are buying because many being sold in retail stores are half-dead. And finally, realize that it isn't easy to successfully grow carnivorous plants at home since they are adapted to boggy, nitrogen-poor soils. Perhaps it would be better to observe carnivorous plants growing in the wild. You can find round-leaved and long-leaved sundews in certain boggy areas in the Sierra Nevada Mountains.

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