Hungry Green Carnivorous Plants
By Dr. Reese Halter

The most remarkable aspect of nature is how organisms have carved out an existence in the harshest of environments.

Plants, as an example, have adapted to live in soggy and sometimes perpetually saturated soils and ponds that are extremely acidic, very nutrient poor but with lots of bugs buzzing around. They still survive, like all other green plants, from the sun's energy. But they've also learned to supplement nutrient deficient soil from an unusual source: Welcome to the world of green plants that eat ants, grasshoppers, slugs, spiders, mosquitoes, flies and even green tree frogs. These are carnivorous plants!

Carnivorous plants have generally weak and small root systems because they have specialized - and costly - traps that lure and digest their animal prey. They are perennial, shade intolerant plants that live for at least two years and require a cool winter dormancy period. They don't tolerate competition and require frequent low temperature fires to burn off dead and dried plant materials, reduce competition and promote seed germination.

Carnivorous plants live in bogs or places in the forest with wet spongy ground often consisting of sphagnum moss and other decomposing vegetation that forms peat. They also live in fens that are flat open sand-based expanses covered with a thin layer of peat with shallow water imperceptibly flowing.

So how exactly do carnivorous plants lure, trap and digest their prey? They produce beautiful flowers that are mellifluous and full of nectar or a sweat fructose sugar that's referred to as "the junk food of the plant kingdom."

The traps are quite attractive and, in fact, can be confused by some as flowers. There are four kinds of traps: closing, suction, adhesive and pitfalls traps.

The Venus flytrap is an example of the closing trap and called by Darwin "the most wonderful plant in the world." Its leaf blade is modified into two parts or lobes that look like a book open at a 45-degree angle. It relies on specialized plant hairs, usually three per lobe, located on the interior surface of the trap to detect its prey. If the prey brushes against the hairs normally nothing happens (unless air temperatures are very high then it snaps shut). If the prey brushes the hair again or touches another hair within 20 to 40 seconds of the first contact, the trap will snap quickly closed.

The Venus flytrap can only be opened and closed about nine times per day. It's a trigger sensitive trap that will not be activated by either a drop of rain, a blowing plant fragment or a prey that has escaped.

Bladderworts use a suction trap taking advantage of their aquatic habitat. The bladder or trap is a bag-like structure, a few millimeters wide, with an opening or trap door at one end. When the trap is set it pinches inward and contains a negative pressure – much like squeezing the bulb of an eyedropper. There are sensory hairs protruding from the trap door. When an unsuspecting water animal swims by it stimulates a trigger hair, the trapdoor opens inward and the negative interior pressure sucks the helpless prey in as the door closes. This happens so quickly that modern science has yet to accurately measure it.

Sundews and butterworts use adhesive traps. They produce gooey droplets that glisten in the backlighting sun and entangled the prey. Once entrapped the sundew leaf blades slowly fold inward to the centre of the leaf. The flat leaves of the butterworts, on the other hand, curl on the margins to form a shallow bowl. It takes from 30 minutes to a couple of hours for the adhesive leaves to fold or curl.

Pitcher plants are the largest of the green-leafed carnivores and they use pitfall traps. At the tip of most pitcher plants is a flattened to slightly curved, flap-like structure called a lid or hood. Beneath the hood the waxy neck is lined with stout downward pointing hairs. The neck or tube funnels into a narrow base at its bottom containing a primordial broth to digest its prey. As an insect stretches down into the pitcher in search of more rich nectar it slips and tumbles to its demise.

Bumblebees, however, are able to move in and out freely from the pitcher plants and gorge on nectar as they are important pollinators. Green tree frogs and yellowish green crab spiders hang just inside the pitcher rim and partake in some of the incoming prey. They don't harm the pitcher but occasionally a frog slips in and becomes a large nutritious meal for the plant. There is some mosquito larva that can actually live in the pitchers digestive juices! The adults enter and exit the pitcher by walking the funneled tube with specially adapted non-slip footpads.

Insects and other small animals are packed with protein and very effective at promoting growth of carnivorous plants. Once the prey is captured, special glands in the leaves release a watery solution made up of fast acting proteins that are able to dissolved the hard outer surface or exoskeleton of insects. The glands also absorb the digestive nutrients and carry them throughout the plants vascular system (just like veins in the human body).

It takes a Venus flytrap about four days to digest its prey and about another four days before it reopens. Each of its traps are capable of three to four digestive cycles in its lifetime.

Habitat destruction, fire suppression policies, introduction of exotic plants and mass illegal collection for commercial-use have all had a disastrous affect on native carnivorous plants.

Carnivorous plants and their extensive habitat in the north country are indeed worthy of protection. Over the past 65 years, Ducks Unlimited Canada has protected and conserved many waterways including magnificent bogs and fens that are hope to carnivorous plants.