Earth-Air-Fire-Water. These are the four classical elements that were once considered the fundamental principles that held the power upon which worldly existence was based. Today we know that nature is more complicated, but it turns out these are still the most important elements to understand when growing carnivorous plants.

Carnivorous plants are strangely specialized members of the plant kingdom, bearing modified leaves that attract, catch, digest and absorb nutrients from insects and other small arthropods. There are over 600 different species occurring all around the world and belonging to some ten unrelated families of flowering plants. Always, it is the leaves that do the dirty work. They may look like flowers and attract unwary insects seeking nectar. Many times they resemble dead meat—all red and rotten looking—to attract carrion feeders. Frequently, they are simple traps that insects accidentally stumble upon as they go about their innocent lives. The victims are variously drowned, squeezed to death, chopped to pieces, or smothered in gloop in odd-looking leaves that resemble tubular pitfalls, fast-acting bear traps, slimy flypaper surfaces, or “roach-motels.” Often the prey is devoured by other organisms living in co-habitation with the carnivorous plant. This serves both partners in making a living in a frightfully competitive world. If this tale of the gruesome monsters of the plant kingdom has not turned you off, read on!

Caption: Bog Garden by Paula Gross; Used with permission.

Now, let’s get back to the four elements:

**Earth.** All carnivorous plants live in nutrient poor soils. Often they are acidic peaty and sandy soils, that are highly leached, where nutrients (especially nitrogen and phosphorous) are quickly lost. This condition helps keep “normal” plants from taking over the habitats and gives the smaller, specially adapted plants room to grow. Using insects as a source of nutrients—fertilizer on the hoof so-to-speak—helps the carnivorous plant compete.

**Air.** Carnivorous plants love high humidity and fresh air. Humid habitats breed an abundance of insects and keep the delicate plant leaves functional.

**Fire.** Many carnivorous plant habitats burn regularly. This keeps other vegetation in check and releases nutrients into the poor soils. Some carnivorous plants will only germinate if their seeds are exposed to the chemicals in smoke. There are many non-carnivorous plants that are fire adapted, as well, and are found growing in carnivorous plant habitats.

**Water.** Carnivorous plants love wet habitats, usually the result of high rainfall. In some regions, the heavy rainfall is seasonal followed by a period of total drought (for example, in SW Australia and SW South Africa). In other places, water comes via groundwater streams and springy seeps (as in northern California). Many times the habitat is wet year around (in eastern US and NE South America). In general, carnivorous plants like pure water low in dissolved minerals, but you do not have to use pure rainwater. At the greenhouse, we have used Charlotte city water for years with no adverse affects.

Caption: Good Dish Garden by Paula Gross. Used with permission.

Where in the world would you be able to find a concomitance of these environmental conditions suitable for carnivorous plant development? It turns out that every continent has suitable spots, as hinted at above. You may be surprised to know that the place which harbors the greatest diversity of carnivorous plants is southeastern North Carolina and adjacent South Carolina—an area within a 100 mile radius of Wilmington. Here you find the world-famous Venus
Flytrap, *Dionaea muscipula*, occurring naturally nowhere else on the globe. Also, there are four species of Pitcher Plants, *Sarracenia*, four species of Sundews, *Drosera*, ten species of Aquatic Bladderworts, *Utricularia*, and three Butterworts, *Pinguicula*.

In growing carnivorous plants, you must pay attention to what is represented by the four elements of nature. They need constantly moist, acidic, nutrient-poor soils, plenty of sun (no competition from dense vegetation), humid air, and (preferably) insect prey. Can you provide these conditions in your back yard or on your deck? Of course you can—right here in the Charlotte region. It’s certainly humid and sunny, and we have good city water. You can create a moisture-retentive bog garden in a bowl, pot, tub or pool. Carnivorous plants are not good house plants unless you have them in a BIG window or under lights. Some species are more amenable to such conditions than others: there are tropical carnivorous plants that grow in jungles and somewhat shady places. Our native carnivorous plants of North America are hardy outdoor perennials and can be grown year around in a bog garden. We have kept all these carnivorous plants outdoors for decades, and they have gone as cold as minus 6° F. (1985). Some can be grown in the far north where they survive frozen under an insulating blanket of snow.

Carnivorous plants are interesting enough themselves; they have intriguing trapping leaves and often colorful flowers. To watch insects visit and get caught, or even escape, provides endless hours of entertainment and wonderment. To see the plants develop and grow, forming larger clumps and blooming better each year is just as rewarding as nurturing any unusual plant that you may have grown. In addition, they represent a bizarre element of nature: plants that do something quite different from the ordinary and that help call attention to the marvels of the plant kingdom.

But there’s more! Once you have built your containerized bog garden, you are ready to grow other pretty non-carnivorous plants from the same habitat. Consider these: spring-flowering Rose Pogonia, *Pogonia ophioglossoides*; and grass-pink Orchids, *Calopogon tuberosus*, which bloom for weeks. And these: Summer-flowering Marsh Pinks, *Sagittaria*; Bog Milkweeds, *Asclepias lanceolata*; Bog Hatpins, *Eriocaulon*; and Orange Milkworts, *Polygala lutea*. Then, autumn’s showy Blazing-star, *Liatris spicata*; Bog Vanilla, *Trilisa*; and Barbara’s Buttons, *Marshallia graminifolia*. All these make for a menagerie of delicate wildflowers rarely seen outside the mosquito-infested habitats across the water-filled ditches down east—the places people unknowingly whiz by on their way to the beach to enjoy the sand dunes and salt water, another totally different habitat to explore.

Carnivorous plants definitely represent an extreme facet of nature, but they can be cultivated and enjoyed in a small space with minimal effort (and where weeds don’t grow too fast). You just pay attention to the ancient elements, and come up with a modern solution to the common practice of thinking that our native plants are unworthy of notice.

**Quick Culture Notes.** Soil: 60% Canadian peat: 40% white pool filter sand, kept moist to wet. Drainage is needed; these are not aquatic plants and cannot take standing water or anaerobic soil conditions. Carnivorous plants must NEVER dry out, as they do not recover. Give at least a half day of direct sun, or VERY bright part sun NOT under a tree. Plants may be left outdoors in winter, but must not dry out. They go dormant, though some are evergreen. They may be kept on a cool or unheated porch with some sun, or in a cool greenhouse or sun room. They will wake up in March as the days warm.

**Addendum.** The Green Swamp in Brunswick County, NC is a famous nature preserve owned by the Nature Conservancy where all carnivorous plants may live under protection. Check out the Internet for natural places and botanical gardens to see carnivorous plants. The UNC Charlotte Botanical Gardens and the NC Botanical Garden in Chapel Hill are excellent public gardens, as is the Atlanta Botanical Garden. An excellent book is *Carnivorous Plant of the United States and Canada* by Donald E. Schnell (2002) or the new book *Bizarre Botanicals* by Larry Mellichamp and Paula Gross (2010). LM
Dr. Larry Mellichamp is a Professor of Botany at the University of North Carolina at Charlotte where he has taught botany and horticulture courses for over 34 years. He is currently director of the UNC Charlotte Botanical Gardens. He writes and speaks on such topics as pollination biology, bog gardening, native orchids and wildflowers, endangered species, and landscaping with native plants, and is one of the world's experts on North American native carnivorous pitcher plants. Dr. Mellichamp has traveled and collected plants in Mexico, Costa Rica, Borneo, Hawaii, South Africa, China and Australia. He has received several teaching awards, was the 2003 recipient of the Thomas Roland Medal of the Massachusetts Horticultural Society, and the first recipient (2009) of the B.W. Wells award for educational efforts from the NC Native Plant Society. Mellichamp is co-author of the textbook Practical Botany (1983) and the books The Winter Garden (1997) with Peter Loewer, and Wildflowers of the Western Great Lakes Region (1999). His most recent book with co-author Paula Gross is Bizarre Botanicals: Weird and Wonderful Plants You Can Grow, published by Timber Press in October 2010.

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