Grow Venus flytraps indoors

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Keywords: cultivation, Venus flytrap, *Dionaea muscipula*.

When old timer carnivorous plant geeks get together, the conversation invariably gets to how many Venus flytraps (VFTs) they have killed. Fifty years ago, we had an excuse. Part of that excuse is we had no clue how to grow them. There were no books about growing carnivores. But even when books were eventually written and Carnivorous Plant Newsletter came into existence, the information was not exactly correct for growing VFTs indoors. The authors grew their plants in greenhouses and described what happens in greenhouses. I will not bother giving references here because it would be every carnivorous plant book with cultivation information that I have seen, except, I will give Adrian Slack (1979) kudos for not saying Venus flytraps will die if they do not get winter dormancy.

I am guilty of providing misinformation as well and I am sure there are still vestiges of dormancy for indoor VFT plants on the ICPS website that I have yet to purge. This does not change what you do for outdoor plants. If you grow your VFTs outside, you do have to pay attention to climate and dormancy. If your plants are outside and the temperature is going to be cold enough that the growth point of the plants will freeze, they MUST be dormant when it freezes, or you must put them in a sheltered location. I lost a lot of VFTs from a late freeze about 10 years ago. They survived being frozen solid twice during the winter but had started growing when we had a late spring freeze that even damaged native plants. I decided at that point I was done growing VFTs outside. Besides, when did I see them outside? I have to live with my plants. That means growing VFTs indoors where I can see them all the time.

I do not claim that how I grow my VFTs indoors is the best way ever or even if someone tries to duplicate what I do that there will not be problems. So much depends on the exact details of what you can and cannot do. If what you are doing works for you, great! Some of the details are general for any plant you grow in pots; others are critical for VFTs.

VFTs do not need high humidity. In the house I use terrariums I made that are leaky and never fog up. The point is to see the plants, not just to have them. Without the terrariums I would have to refill the water trays every other day because our humidity is very low. I do grow a lot of VFTs in my garage under lights without terrariums and have to refill the trays daily during hot weather. I cannot tell any difference between plants grown with and without terrariums.

The size of the pot and the soil mix have to be matched to the needs of the plants. VFTs are not bog plants that can be grown long term semi-aquatically or in saturated soil. But they do need to be in a wet soil typical for fen plants. Fen plants are easy to grow in greenhouses and outside because they like lighter soils and to be hosed off regularly. They are not so easy in houseplant situations. VFTs themselves do not use much water. They have few roots that are essentially drinking straws so are not very efficient extracting water from damp soil. You need to balance available water for the plants and the fact that old leaf bases that make up the bulb will rot in soggy soil. You want to delay bulb rot as long as possible.

I use 8 cm square by 9 cm tall pots because they fit perfectly in standard “1020” plant trays. It is difficult to get pots of this size now. There is no reason not to use bigger pots with multiple plants per pot or whatever else you can find in the way of tall pots or plastic cups. Larger pots will also help maintain enough soil moisture if for some reason the trays or water dishes dry out for a while.

Pots that are 10 cm square and 12 cm tall are easy to get and work great for multiple plants. They just do not fit nicely in 1020 trays.

Pick a soil mix that keeps the roots fairly wet but not so wet as to become anaerobic. I use 50:50 peat:sand. What exactly does "50:50" mean? Half and half by volume? By weight? I have no clue. I say that to mean "not overly sandy" and "not overly peaty". Pure peat tends to become stinky. Pure sand would not wick up enough water. You want a nice balance of the two. I use more sand in shallower pots and more peat in deeper pots.

I only use a particular brand of peat that is a little hard to find, from a company that specializes in potting soil. The most common brand of peat is usually much too salty. The peat is mined as an inexpensive garden soil amendment and is not the quality you would like for a potting mix. I also wash/rinse the peat before I use it.

The sand I use is relatively coarse, graded, and washed. It is available in various mesh sizes where the "mesh" is the number of wires per inch in the sieves. I have found 14 and 16 mesh silica sand to be best but have had to settle with 12 and 20 mesh when that was all I could get. It is usually only available at specialized construction materials companies. Finer sand such as filter sand can pack tightly and keep water from wicking up through the soil mix. If all else fails, you might try sieving builders sand to remove the finest particles.

I never use perlite, pumice, vermiculite, or regular potting mix for my VFTs. Perlite and pumice are generally too salty, and many brands add fertilizer. Vermiculite breaks down into mush quite quickly. Regular potting mix is generally too coarse from the ground bark and leaf compost, has been "corrected" to a neutral pH, and has added fertilizer. I do not use long fibered *Sphagnum* for my VFTs because I think it should only be used for plants where it is the only good option. However, it may be the only option for some growers, and it does work great as a peat substitute.

I believe it is critical that most of the VFT bulb not be in the wet soil mix. I plant my plants with the bottom of the bulb and the roots in the soil mix, then top up the pot with about 2 cm of pure sand (Back Cover). The pure sand serves a number of purposes. The sand helps keep the older part of the bulb from rotting. With the sand, you do not get a mat of moss that the new growth has to plow through, and the moss could cause the soil mix to become anerobic. The sand allows air to get to the deeper soil. The sand also is not attractive to fungus gnats. Fungus gnat larvae are a bane of small plants and I do not want them in my terrariums. As the plants grow, they tend to find the level they like. I find they do not dig deeper into the soil. The bulb remains in the sand layer. The only problem with using dry sand in pots in the house is if the pots tip over, they can make a big mess.

The soil in the pots must never dry out. Some of my indoor VFTs constantly sit in 1 to 2 cm of water. Others get water added to the trays up to 3 cm deep when the tray dries out. I never top water them except during the repotting process. I am fortunate that my city tap water is usually around 50 ppm of dissolved solids. Most people probably have to invest in RO water or collect rain water. Bottled drinking water and filtered water can be deadly.

The plants need at least 15,000 Lux of white LED light for about 14 hours a day. The plants will grow even better with 25,000 Lux. This much light requires 20 to 30 W of white LEDs per 30 cm diameter of growing area. In the house I only use 3000K, 90+ color rendering index LEDs because of the enhanced deep red to better match the chlorophyll absorption spectrum. To me the plants look best under these lights as well. This is a lot of light. The plants need that much light to grow well. It is hard to get that much light from fluorescent lights without having heat issues. In the garage I use a mix of white LEDs and purple LED plant lights. You need the white light because you cannot see the purple light very well in spite of the fact it is very intense. Because of different designs of purple plant lights, the ratio of blue, red, and white light, and the difficulty measuring the

amount of light, I do not know what to recommend. Also, you have to be careful of manufacturers advertising "watt-equivalents" instead of actual watts.

It is critical that the plants be fed regularly. Strong light and regular feeding are the keys to growing VFTs indoors long term. In other words, the plants must be growing constantly and to do that they need lots of light and lots of food. I feed the plants with rehydrated freeze-dried bloodworms, which is a kind of fish food. The more you feed the plants, the faster they grow and larger they get. If their growth slows down, feed them. (See Figure 1 and the ICPS website has a page on feeding plants with bloodworms: https://www.carnivorousplants.org/grow/feed/bloodworms).

I do not know what temperature triggers dormancy in VFTs. My plants in the house do not slow down during the winter. They get 15 hours of LED light daily but do tend to bloom in the spring, presumably because they get some sunlight before the LEDs turn on at 7 AM. The plants in the garage slow down during the winter but never go dormant. Their lights are on a timer that adjusts for natural sunrise and sunset. I just keep feeding them to keep them growing because they are plants I am propagating.

The plants need to be repotted every year or two. At some point the plants will have grown across the pot and slammed into an edge. It is also possible for the soil to get too salty or something else bad to happen so the roots die and the new traps turn black before they open. Repot the plant in fresh soil as soon as possible if the plant will not eat. Otherwise feed it well, then after a few weeks



Figure 1: Feeding a Venus flytrap with rehydrated freeze-dried bloodworms.



Figure 2: (A) A Venus flytrap that has been growing indoors and is in need of repotting because it is starting to hit the side of the pot. (B) The plant unpotted, trimmed, and older part of the bulb cut off. Notice how few roots there are. You use large pots to retain water, not because the plant can become root-bound. (C) The division planted in peat/sand soil. Note almost all of the plant is above the peat/sand soil level. (D) The division back with its buddies in the terrarium after the pot has been topped up with pure sand.

repot it. Do not reuse the soil; it can be used in the garden or for outdoor-only carnivores that get rained on. (See Figure 2)

When you repot the plants, you will need to reduce the size of the bulb. Use this opportunity to increase your collection of plants or to have plants to give away. (See Figure 3 and there is a page on the ICPS website about using the old bulb leaf bases to produce new plants: https://www.carnivorousplants.org/grow/propagation/DionaeaLeafPullings).

In this day and age there is no excuse not to grow Venus flytraps long term indoors. No refrigerator is necessary. Just keep the plants growing year-round. Doing so was somewhat problematic before LED lighting. Now there are lots of effective lighting options. If you cannot collect enough



Figure 3: (A) Leaf base pullings from the old part of bulb planted in soil before 1 cm of sand is added to the pot, completely covering the leaf bases in sand. (B) After six to 12 months, the leaf pullings should look like this.

rain water when you need it, RO water is generally available. And high protein fish food such as freeze-dried bloodworms is more available now than in the past. The hard part can be finding decent soil ingredients. In the end your plants can live with you instead of just lurking somewhere you only see them occasionally.

References

Slack, A. 1979. Carnivorous Plants. MIT Press, Cambridge, MA, USA.

