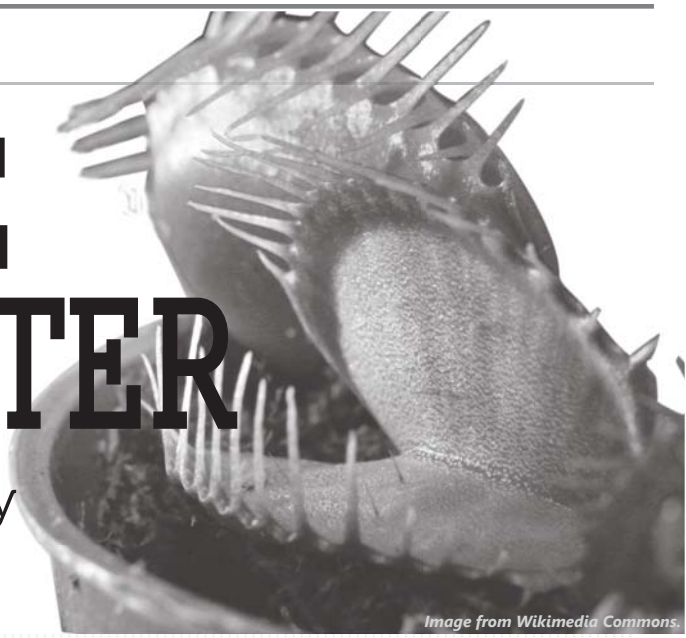
FEEDING THE LEAFY MONSTER

How Venus Flytraps Made Their Way

By Tristan Wang



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It is a well known fact that the ants and flies in the world should fear the carnivorous Venus flytrap, but in order for these plants to continue what they have been doing, they'll have to grow to eat humans 50 times their size. For millions of years, carnivorous plants have adapted leaf modifications to catch and digest their prey, but since their discovery, these plants have been traveling the path of other extinct species under the threat of habitat destruction, or the degradation of ecological systems and their usefulness to the inhabitants. Carnivorous plants, however, carry the additional drawback of recognition that has led to severe poaching, a problem just as demanding to deal with because of the difficulty of controlling native lands.

Carnivorous Plants

Although they seem more like novelty items at a pet store, carnivorous plants gained fame through their trapping mechanisms, adopted as leaves to lure and catch insects for a source of nitrogen and phosphorus that the soil they live on cannot provide (1). Anything that can be caught becomes prey, and with a diet ranging from insects to small vertebrates and fish, traps vary incredibly. For example, while the Nepenthes and Sarracenias (pitcher plants) are renown for catching prey that fall into their pitfall traps, the less famed Utricularias (bladderworts) have suction traps that inhale small water fleas and aquatic preys (1). Droseras (sundews) and Pinguiculas (butterworts) each heavily use sticky adhesives to catch flying insects and small ants respectively and underneath the soil, Genlisea (corkscrew plants) lure protozoans into snare traps of a network of tubes leading into a digestive chamber (1).

These carnivorous plants have evolved specifically to poor soil where there is less competition from other species (1). Boggy and sandy sites are also often filled with peat moss that, along with the water from precipitation, contributes to the low pH of the soil (1).

The Venus Flytrap

The Dionaea muscipula (Venus flytrap) lives in these bogs, and like several of its kind, has been effective enough to lure poachers who, armed with no more than a spoon or hand-held shovel, uproot these plants from the wild and sell them for about a quarter each. In the plant world, it's uncommon to find noticeable movement and with leaves that appear as ravenous mouths, it's no surprise that word spreads. Each leaf of a Dionaea has been modified as a closing mechanism that hinges at a large vein at the center of the leaf. Luring prey with a sickeningly sweet scent, the leaves are armed with trigger hairs on the inside and snap shut when disturbed (1, 2). This process takes place inside a leaf when turgor pressure, water pushing outward from the inside the cells, expand mesophyll cells in certain parts of the leaf and closes the trap (3).

Threats to the Carnivorous Community

Carnivorous plants' decline has been attributed to several disturbances, or in the case of Venus flytraps, the lack of disturbances. Wildfires control unruly growth that block out sunlight, which is especially harmful with the Venus flytrap's short stature (4). By modifying itself to act like an animal, Dionaeas lose characteristics that make it a plant. Undoubtedly, "Because flytrap leaves are used to grab dinner, they harvest sunlight inefficiently, which stunts their growth" (2). Frequent wildfires no longer clear dead brush and the build-up of plant matter can set stage for even more devastating fires that few plants survive (2).

Moreover, accidental fertilization due to nitrogen compounds carried over wind and air contribute to decline. While extra nitrogen is generally beneficial to plants, carnivorous plants lose their advantage in poorer soils against competitor plants (1).

Development alone has taken over about 70 percent of the flytrap native habitat leaving even fewer than 150,000 wild plants (2). As human populations continue to grow, more land is needed for residential lives and agriculture, and these natural lands are quickly being converted (1). Venus flytraps have little to come back with because their natural populations are concentrated only in the bogs of the Carolinas of the United States. The localization of the species only adds to the preserved rarity of the plants and further contributes to poaching. Poaching, while

not as severe as habitat destruction, happens without warning. A few people can go into a forest and come out with pockets full of bulbs without punishment, and the accumulation of population loss through this is comparable to land development.

Need for Intervention

Due to the small root bulb sizes and small seeds, a person can easily travel with hundreds of plants over long distances and the shallow roots and clumping of plants make an ideal situation for poachers to make a quick pick (2). The responsibility for protection lies with the government and several conservation groups, but with listings as "vulnerable," there are few plans to regulate the Venus flytrap populations. The World Conservation Union (ICUN) categorizes troubled species on a spectrum based on the risk of extinction that regards population size and history (5). A species is only given federal protection when categorized as threatened, endangered, or critically endangered, but the Venus flytrap does not fall under these categorizations (5,1). Thus, the risks of a small fee and in the more severe cases, short term jailing, may seem favorable for poachers to dig up hundreds to thousands of plants. This in turn can severely cripple entire populations.

Venus flytraps and carnivorous plants in general have made their way into postage stamps, plays, movies and comic strips world wide and this recognition has led to belief that the plant has rarity value (6,1).

Earlier this year, three people were arrested carrying at least 200 flytrap pods after facing accusations of poaching (7). This example, however, may only be one of many more that went uncaught because of the difficulty of implementing protections and garnering support. Tom Chrisdock, special agent of the U.S. Fish and Wildlife Service said, "Plants are a challenge because they don't have big brown eyes and fur" (8). Plant poaching prosecutions are not as prevalent as they should be because priority often goes to animals, so as long as the risks remain low, poaching will continue (8).

Commercialized Plants

However, Venus flytraps are propagated commercially worldwide and purchasing a plant from a respectable seller is fairly cheap. Conserving the natural habitat and populations is of the upmost importance to retain the genetic variation among the plants that even breeding cannot preserve (6, 2). Species cannot live indefinitely in cultivation where there is no natural selection (6). Thus, the North Carolina Plant Protections and Conservation Act reclassified the flytraps as a protected species with punishment for poaching of $50 in fines and up to 60 days in jail, but as recent poaching attests, the plants may need even more (6).

Hopes are high due to the passionate groups and enthusiasts who dedicate their lives to conserving the Venus flytraps, but poaching affects other carnivorous plants and orchids worldwide, so Venus flytraps may be getting more than their fair share of attention. The reputation of these plants has long served the dual-purpose of both drawing poachers and increasing awareness among those who want to save them but this is not an issue that should be localized to just one organism. Poaching is illegal for the entire natural world, and the Venus flytraps can serve as an example of progress on how to fight poaching and threats to natural populations.

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References:

1. W. Barthlott, M. Ashdown, The Curious World of Carnivorous Plants: A Comprehensive Guide to Their Biology and Cultivation. (Timber Press, Portland, Or. 2007).
2. A. Tucker, The Venus Flytrap's Lethal Allure. Smithsonian. (Feb. 2010)
3. D. Hodick, A. Sievers. "On the Mechanism of Trap Closure of Venus Flytrap (Dionaea Muscipula Ellis)." Planta 32-42 (1989)
4. P.R. Roberts, H.J. Oosting Ecological Monographs , Vol. 28, No. 2 193-218 (Apr., 1958)
5. H.R. Akçakaya, S. Ferson, M.A. Burgman, D.A. Keith, G.M. Mace, and C.R. Todd, Making Consistent IUCN Classifications under Uncertainty. Conservation Biology, 1001—1013. (2000).
6. F.T Norton, Falling Value, Rising Penalties Don't Deter Flytrap Poachers. McClatchy — Tribune Business News. (20 May 2012).
7. A. Jennings, Endangered Venus Flytrap Poached for Profit. ABC News. (ABC News Network, 26 Jan. 2012).
8. M. Baker, Venus Flytraps Caught in Shrinking Natural Habitat. Associated Press. (USA Today, 6 Oct. 2008).

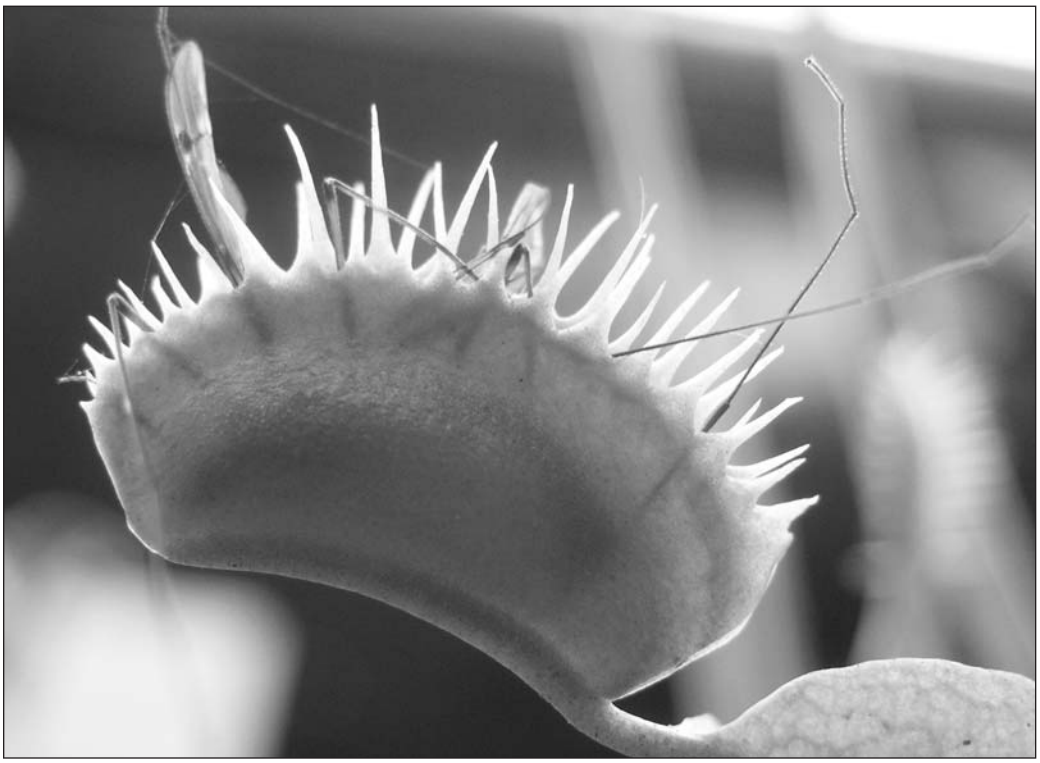

Figure 1. A good catch for the Venus flytrap. ***Photo from Wikimedia Commons.***