Venus Flytrap Background

Latin name: *Dionaea muscipula*

Range: coastal bogs of North and South Carolina

How do Venus Flytraps catch their prey?

- Insects are lured to the leaf's surface by nectar glands
- Two to six (but most commonly three or four) small trigger hairs sit on each lobe of the leaf. When a hair is touched twice, or two are touched within 20 seconds of each other, the trap is triggered.
- The closing of a trap can be divided into two or three stages:
  - **"Initial snap"** or **"Shutting phase"**
    - When triggered, the cells on the outer walls of the leaf suddenly lengthen, doubling their size in less than a second. This quick growth causes the concave dished shape of a lobe to suddenly reverse itself. The two lobes thereby snap shut. A tiny electric current (or action potential) can be detected running through the trap after the hairs have been triggered.
    - Some scientists describe this phenomenon as acid growth, in which the release of acidic compounds in the leaf tissues results in the loosening of some of the fibers in the cell walls. Because of this loosening, the cells are free to expand. The growing cells make one side of the leaf bigger than the other side.
    - The Botanical Society of America (BSA) points out that this process is still poorly understood.
  - **"Tightening** phase**"** or **"Narrowing phase"**
    - The cilia ("guard hairs") along the edges of the leaf intermesh, leaving small spaces through which tiny prey can escape. If the prey is large, it touches the trigger hairs more as it struggles, and the trap will then shut all the way.
    - Turgor pressure fuels this phase. It is an osmotic effect, in which an ion (in the case of Dionaea, K+) released into the leaf tissues makes the cells of one surface of the leaves wilt. This makes the wilting surface slightly smaller than the unwilted, opposing leaf surface. The leaf curls towards the wilting side.
  - Some scientists also distinguish a **"Sealing Phase,"** while others lump this into the narrowing phase.
    - At this stage, the lobes of the leaf are flattened against each other and the cilia are no longer interlaced, but rather reflexed away from each other. The lump of the prey is clearly visible under the leaf surface.

- This phase is also fueled by turgor pressure.

What prey is commonly caught by flytraps?

- Large ants, spiders, various flies, inchworms, and mosquitoes are common prey.
- Submerged plants have been known to catch small aquatic animals.
- It's worth noting that the plants don't consciously choose one insect over another. Prey is opportunistically chosen, and largely dependent on what options are available in the environment.

How long before a trap reopens?

- If a trap closes around viable prey, it takes 3 to 5 days to digest the prey depending on temperature, size of prey, and nutritive value of the prey.
- If the trap is triggered without any prey inside, it will remain in the partly-shut phase for about 30 minutes and then gradually reopen over the course of one or two days.
- There is a wide range in these values.

How many times can a trap close before it dies?

- Individual traps can catch one to four meals, then they turn black and die. Prey that is too large for the trap is subject to bacterial decay, which can kill off a lobe prematurely.
- When triggered empty, the traps can be set off about 10 times before they stop responding.

Why are they carnivorous?

- Venus flytraps grow in nutrient-poor bog environments, and therefore make up for the lack of nitrogen in the soil by extracting nitrogen from digested insect prey.

Vocabulary

- Cilia: eyelash-like fringe on the edge of a leaf
- Guard hairs: cilia, eyelash-like fringe on the edge of a leaf
- Nectar: a sugary fluid secreted by plants
- Gland: a group of cells on a plant's surface that secrete a substance
- Digestion: the breaking down of food into a form that is easily absorbed by the plant
- Absorb: to take in or soak up
- Nitrogen: a nutrient plants use to create proteins and chlorophyll (the green pigment responsible for photosynthesis).
- Prey: An animal hunted or caught for food