Experiment GB-7: Venus Flytrap ~ Reactions

Equipment Required

PC or Mac Computer

IXTA, USB cable, IXTA power supply

iWire-B3G

C-ISO-VFT - electrodes

Venus Flytrap

Tensive tac gel

Small plastic pipette or very narrow plastic or wood coffee stirrer

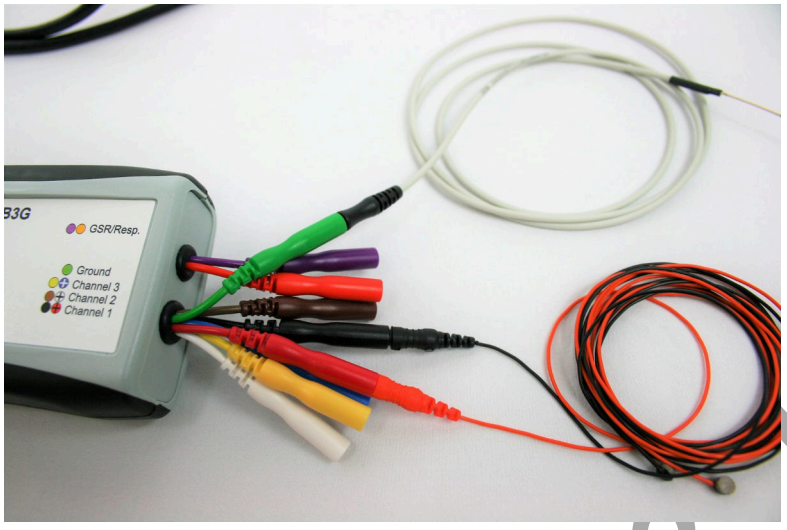
Button Electrode Setup

1. Locate iWire-B3G and the small button electrodes for use with the Venus Flytrap lab.

Figure GB-7-S1: The button & ground electrodes and tensive tac gel for this lab.

2. Plug the iWire-B3G into the iWire 1 port on the front of the IX-TA and then turn the TA on.
3. Plug the red and black leads into the red and black ports on the iWire-B3G. Plug the long ground electrode into the green port.

iworx Sample Lab



4. Remove the pot from any standing water, place the pot on a dry surface, like a paper plate.
5. Place the ground electrode directly into the soil. Push it down into the pot.

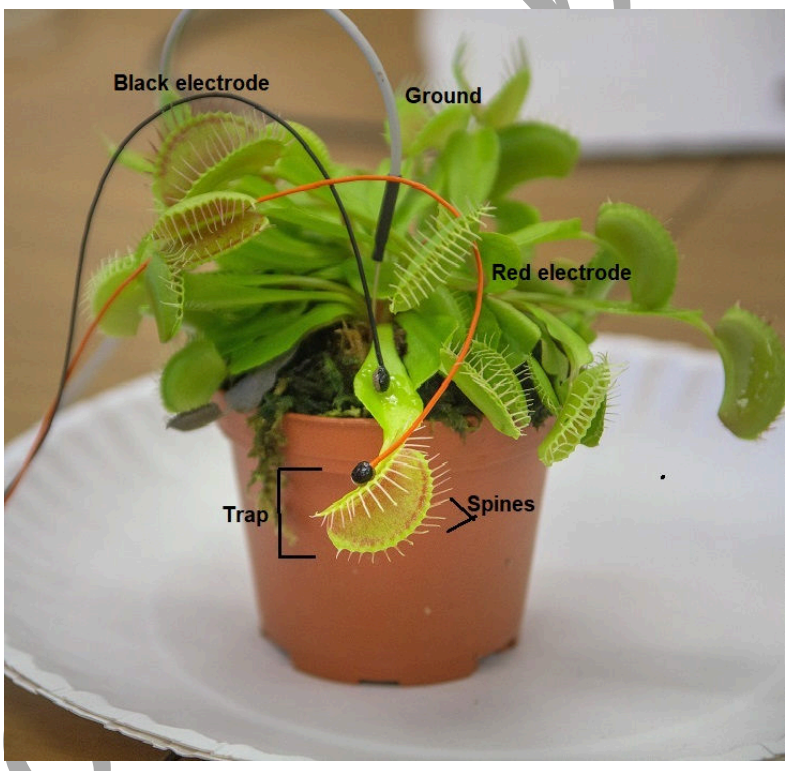
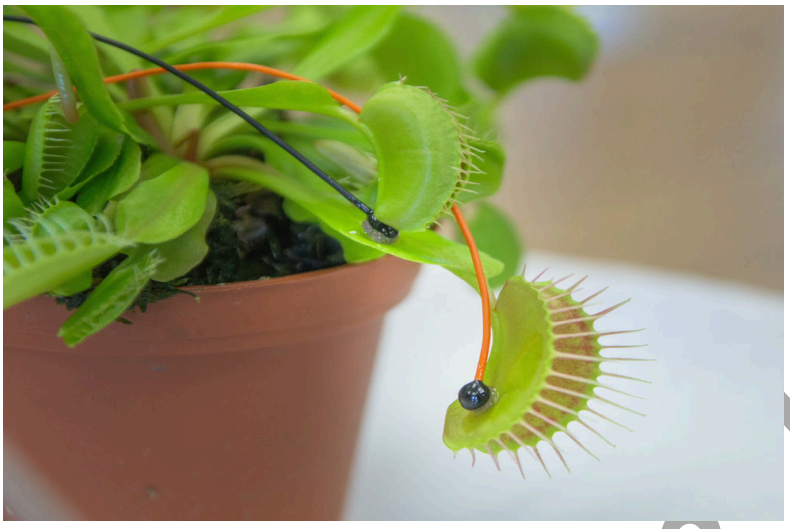


Figure GB-7-S2: The arrangement of the 3 electrodes used in this lab. Note the ground electrode is placed directly into the soil.

Iwo Double Lab



6. Choose a healthy, wide-open trap. Notice the trap and the leaf structure.
7. Place a blob of Tensive tac gel on the black electrode and place it on the leaf of the plant as shown. Make sure it sticks. Be careful not to disturb any of the traps.
8. Place a blob of tac gel on the red electrode and carefully place it on the outside of the trap.

Note: you may need to hold the electrode wires steady until the gel "cures" for a few seconds to make sure it is sticking to the leaf and trap. It is helpful to have the wires supported over other leaves on the plant (see images above).

IworX Sample Lab

Experiment GB-7: Venus Flytrap ~ Reactions

Exercise 1: The Effect of Delayed Stimuli on Trap Closure

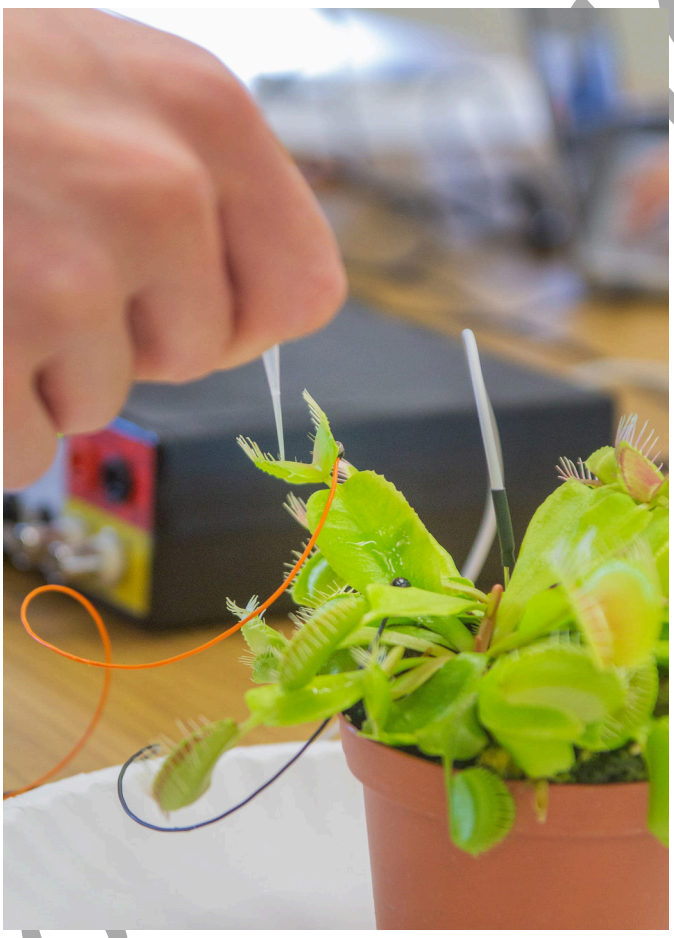
Aim: To observe how the timing of stimuli affects trap closure.

Approximate Time: 15

NOTE: Timing is important. The person operating the computer needs to be ready to immediately mark the recording when the internal spines are touched.

Procedure

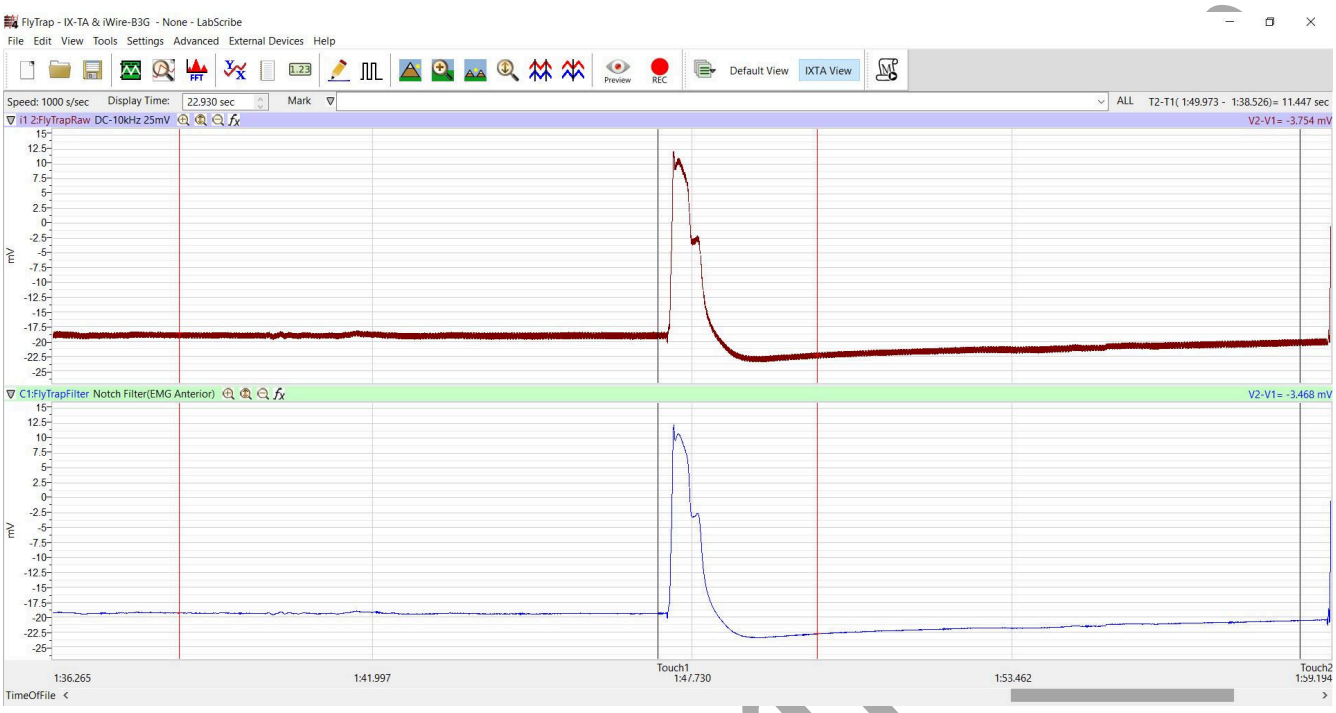
1. After the electrodes have been placed on the Venus Flytrap, make sure they are adhered well.
2. Click Record.
3. Type **Touch 1** in the Mark box.



4. Drag the pipette or coffee stirrer along the internal spines – make sure to click the Mark button on the toolbar to annotate the recording as soon as this occurs.

Iwo Science Lab

5. You should see a reaction as seen below.



6. Continue recording but wait **AT LEAST** 30 seconds before doing the next touch.
7. After 30 seconds has elapsed – type **Touch 2** in the Mark box, drag the pipette across the internal spines and immediately click the Mark button.
8. Wait a few seconds and then click Stop.
9. Click Save As in the File menu. Save your data to the desktop or USB drive.

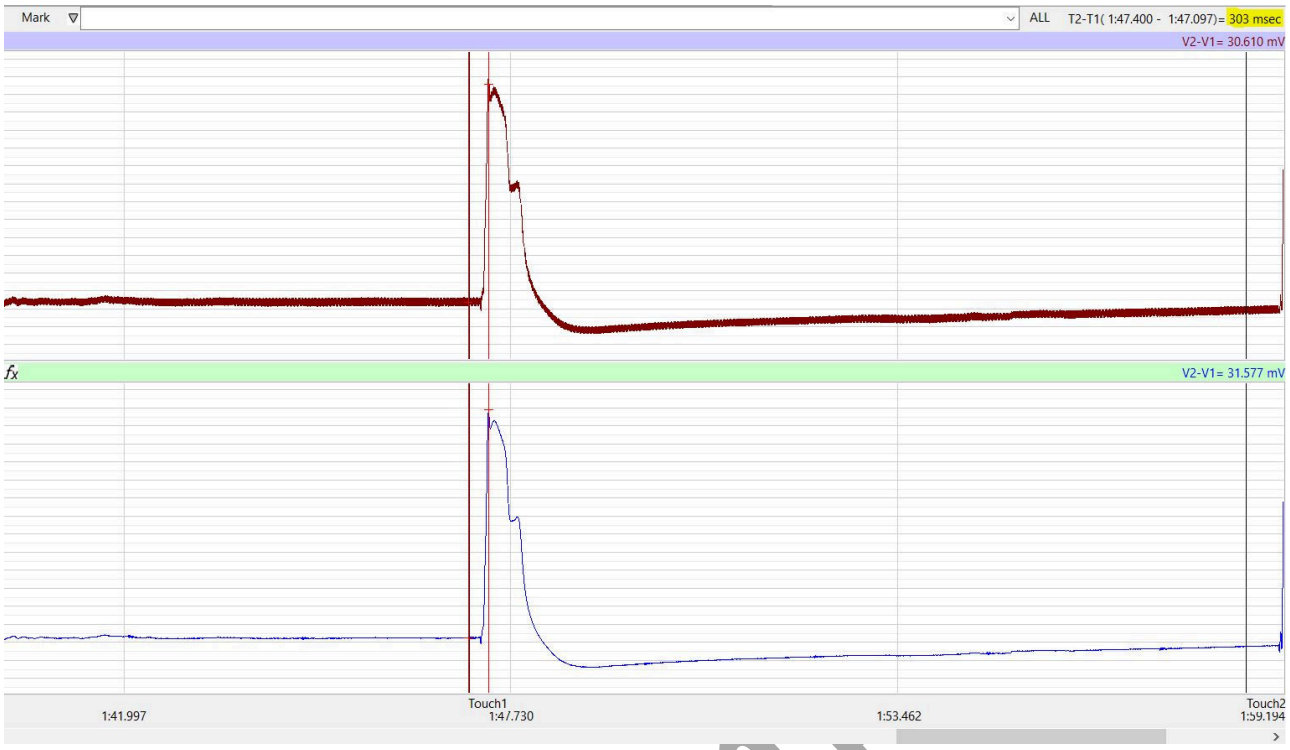
Data Analysis

1. Scroll to the section of the data file when you did the first touch.
2. Place one cursor on the 'Touch 1' mark and the other cursor on the peak of the reaction.
3. Measure T2-T1 in the upper right hand corner of the screen.
4. Scroll to the 'Touch 2' mark and repeat steps 2 and 3.

Questions

1. Did the trap close after the first touch? Why or why not?
2. Did the trap close after the second touch? Why or why not?
3. Hypothesize what would happen if you touched a 3rd time, but still waited the full 30 seconds before doing so.

Worx Sam



Exercise 1: The Effect of Multiple Stimuli on Trap Closure

Aim: To observe how the timing of multiple stimuli affects trap closure.

Approximate Time: 15 minutes

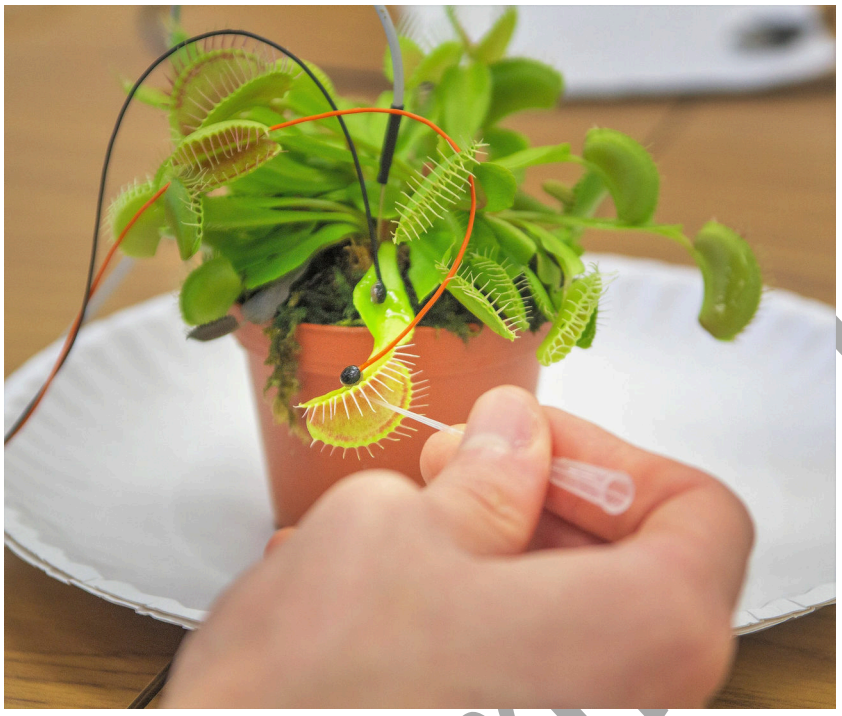
NOTE: Timing is important. The person operating the computer needs to be ready to immediately mark the recording when the internal spines are touched.

Procedure

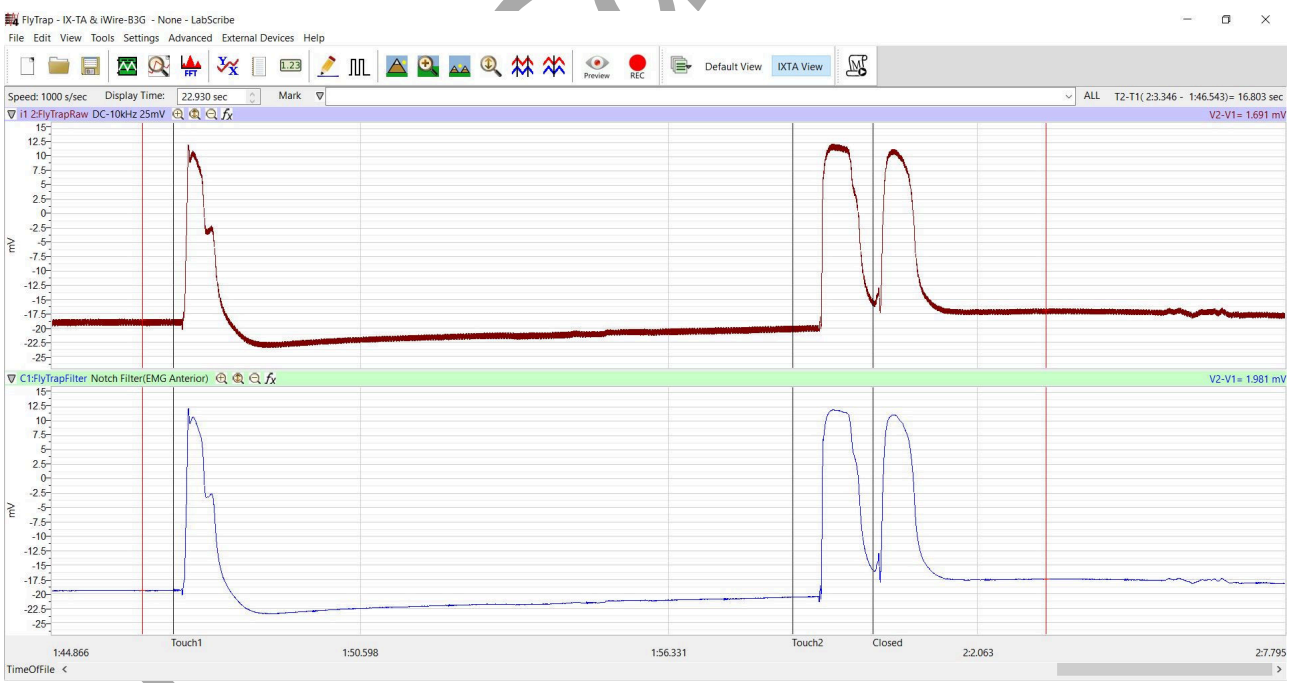
1. After the exercise 1, double check the electrodes to make sure they are still adhered well.
2. Click Record.
3. Type **Touch 1** in the Mark box.
4. Drag the pipette or coffee stirrer along the internal spines – make sure to click the Mark button on the toolbar to annotate the recording as soon as this occurs.
5. You should see the same reaction as in Exercise 1.
6. Wait **5** seconds, type **Touch 2** in the Mark box and repeat step 4
7. If the trap does not close, repeat the process.

IWorx Sam

Note: If the trap still does not close, double check the electrodes. Reattach them with tac gel if needed and repeat Exercise 2.



5. Wait a few seconds and then click Stop.
6. Click Save As in the File menu. Save your data to the desktop or USB drive.



Data Analysis

1. Scroll to the section of the data file when you did the first touch.
2. Place one cursor on the 'Touch 1' mark and the other cursor on the peak of the reaction.
3. Measure T2-T1 in the upper right hand corner of the screen.
4. Scroll to the 'Touch 2' mark and repeat steps 2 and 3.
5. Place one cursor on the peak of the first action potential when the trap closed, and place the other cursor on the 2nd peak. Measure T2-T1 to find the time between the 2 successive reactions.

Questions

1. Did the trap close after the first touch? Why or why not?
2. Did the trap close after the second touch? Why or why not?
3. Explain how the Venus Flytrap knows when to close or not to close.

Comparative Labs

This lab is an excellent comparative lab with frog, earthworm and human action potentials.

These are the Animal Nerve and Human Nerve labs:

- Action Potentials-Worm
- Compound Action Potentials (Frog)
- Human Nerve Conduction

Iworx Sample Lab