Going Vertical: New Take on Artificial Nectar Feeders

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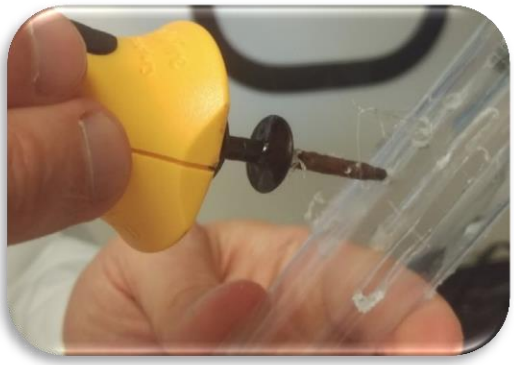
Artificial feeding stations are pretty standard in most flight houses. The material, appearance and construction can vary greatly from one institution to the next but one element they have in common is the feeding surface is on a horizontal plain. There is nothing wrong with the horizontal feeders, the butterflies do just fine on them, but the orientation of the feeding butterflies his hard for visitor to observe. With a horizontal feeder either the dishes are set low so kids can more easily observe the proboscis and the adults have to crouch down or they are set high and small children cannot see.

The Christina Reiman Butterfly Wing opened in November of 2002 and since its opening artificial nectar dishes have been in use to supplement the nectar supply for the butterflies when they are unable to obtain enough substance from the flowering plants. In the Butterfly Wing, a variety of nectar substitutes have been utilized but the primary three liquid mixes are: 5% granular sugar and a dash of ground bee pollen in water, ¼ strength powered Lemon Lime Gatorade in water, and 5% honey diluted in water. Over the years, several attempts were made to develop an easy to use and maintain feeder, with a vertical feeding surface. Some of the early attempts utilized wicks or wooden boards with angled holes drilled in them. Each of these early options was messy, hard to maintain and received minimal feeding attempts.

Superabsorbent polymers (SAPs) or Polyacrylamide Granules have grown in popularity and applications over the last few years. In different applications SAPs have been used at Reiman Gardens for year. While working with SAPs in the Butterfly Lab it was identified that just about any mixed solution could be completely absorbed by the SAP. A batch of the honey nectar solution was mixed and a small amount of SAP was added to the solution. In under 10 minutes the dry granules had swollen in size ~200 time their original weight in water. A larger uptake of the solution can be acquired if a deionized waster is utilized instead of standard tap water. These clear artificial nectar swollen granules were placed in a pile in a cage with butterflies. The butterflies were moved from the cage edges to the pile of SAP and most individual began feeding almost immediately. After some trial and error it was determined to make approximately 1000 mL of nectar gel you need; 600 mL of artificial nectar solution and 1.5 teaspoon dry SAP. If desired a single drop of food coloring can be added to the nectar solution, this color will be present throughout the final gel.

To hold the engorged SAP crystal a vertically oriented manifold structure needed to be created. To create the manifold, fluorescent light bulb tube guards with end caps were utilized. The tube guard was cut to the desired length, 12" was used in the prototype but they could be made longer or shorter. A hot tool was used to melt slits and poke holes in the clear plastic tube. A Hot Wire Foam Factory cutting tool was used to create the prototypes but a soldering iron or wood burning tool could be used to create the same results. In the original prototype only slits were added, after watching the butterflies attempt to feed and not be able to get a footing, holes were added in the spaces between the slits. A thick piece of plastic is added to either end and is held in place by the end caps.



The finished feeder were filled with the SAP gel and then the units were hung in the flight house. Different colors of SAP gels were tested in the feeders, each received visits from butterflies. Through anecdotal evidence the color blue was identified as the best color attractant and therefore became the primary color utilized for the remainder of the trials.

Initially photos were taken each time a new species was observed on the feeder to maintain a record of the different species that utilized the feeders. Later, photos were taken of all of the non-nectar plant feeding station whenever a butterfly was observed on one of the five different options. The five different feeding station included two horizontal dishes with scrubber pads and a liquid nectar solution, a dish with cut fruit in it, a board with long slits in it with mashed fruit added to it and the vertical feeder. 23 photo observations were of butterflies on the different feeders between April 2105 to May 2016. The number of observations where at least one butterfly was seen feeding on one of the different artificial station is listed below.

Nectar Dish #1	Nectar Dish #2	Vertical Feeder	Fruit Dish	Fruit Boards
4	8	16	9	7

All of the photo observation of the vertical feeder were compiled for a comprehensive list of species observed actively feeding from the vertical feeder. This list consists of 22 different species representing 16 different genera.

Archaeoperpona demophon	*Hamadryas feronia*
Athyma perius	*Hamadryas laodamia*
Caligo eurilochus	*Hypna clytemnestra*
Catonephele numilia	*Hypolina bolina*
Charaxes castor	*Idea leuconoe*
Charaxes cithaeron	*Junonia iphita*
Charaxes varanes	*Morpho peleides*
Colobura dirce	*Myscelia cyaniris*
Graphium agamemnon	*Myscelia ethusa*
Hamadryas amphinome	*Papilio Memnon*
Hamadryas februa	*Parthenos sylvia*

None of the butterflies in the Christina Reiman Butterfly Wing were predisposed to the feeder or the SAP gel before being released. All of these observation were of individuals that found and used the vertical feeder on their own.

From work done on Lepidoptera species for conservation purposes it has been determined that the butterflies can be trained to go and feed on the SAP gel in a captive rearing situation. Through just a couple manual introductions, the captive rearing stock of adults recognize the SAP gel as their available nectar source. It is possible modifying the nectar solution utilized, by adding amino acids for example, to enhance the nutritional value of the engorged SAP gel offered to butterflies if need.

The initial undertaking of this project was to create a feeder for the Christina Reiman Butterfly Wing that would be easy to maintain and visitors could easily observe the act of the butterflies feeding. When this project began the artificial feeders were visited daily on a regular basis. Since that time, due to relatively drastic changes to the plant selections in the Butterfly Wing they use of all of the artificial feeding stations has gone way down. Except for a small area near the entry and exit area of the Butterfly Wing, all plant are nectar producing plants at some time during the year. This increase in available nectar from flowers has a direct correlation with a decline in artificial feeding station use. During the winter months when light levels are lower is when the vertical feeder currently receives its greatest amount of visits. The vertical feeder will continue to be used in the Butterfly Wing as supplement to their feeding but the SAP gel use in captive rearing shows the greatest promise for expanding its utilization.