

POLLINATION OF HELIAMPHORAS

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Far more people are growing *Heliamphora* spp. than fifteen years ago. Since I am getting more mail requests for information on pollinating and producing seed from these plants, I thought it might be useful to update the procedure from earlier comments in CPN.

It seems worthwhile to comment on floral observations in nature. An excellent summary article on this, based on actual observations and not suppositions, is by Susanne S. Renner (1989). She spent 20 days during February atop Cerro de la Neblina observing *H. tatei*. There have been numerous comments by those exploring the tops of tepuis about the lack of insect life. Several observers have suggested that birds, particularly hummingbirds, may be heliamphora pollinators. However, Renner observed that the flowers are odorless and produce no nectar, so this is unlikely.

While relatively few in numbers with an average of only ten flower visits a day, Renner observed euglossine bees including bumblebees and carpenter bees, visiting the flowers on rounds. These and other bees were trapped with the aid of a special bee bait for identification and enumeration. Clearly, if observations are carried out long enough for a dedicated period during the day over a number of days, one can note these potential pollinators atop tepuis.

More to the point, the bees "buzzed" the flowers as they visited them. This is an activity carried out by bees when visiting certain flowers. They vibrate their wings, eliciting a buzzing sound to us, and in the process cause pollen to be released by the anthers. Unfortunately, heliamphora anthers, similar to many other species of plants, do not burst open and shed pollen. Instead, pollen is released through tiny pores at the ends of the anthers upon vibratory stimulus, such as bee "buzzing". Heliamphora anthers do not have true pores but have functional ones instead. SEM photos in Renner's paper show little slits at the end of each of the four anther chambers that behave as pores with pollen release via these openings.

Another feature of heliamphora flowers which we observed long ago and has been confirmed by Renner is that they are protogynous. This is another feature that is common among other plants and it means that the stigma of the pistil (pollen receptive and seed producing organ of the flower) is receptive to pollen before pollen is mature in the anthers in a particular flower. When the anthers finally can shed mature pollen, the stigma of that one flower is no longer receptive. But since there are other flowers in the plant community, mature anthers and receptive stigmas occur simultaneously among many plants, the feature thus encourages cross-pollination. But I have also observed that flowers on the same plant can be crosspollinated so one need not have several plants of different strains available in flower at one time. Since heliamphoras usually have more than one flower per stalk, and perhaps more than one flower stalk per plant, we have an opportunity to pollinate flowers and produce seed from the plants we grow.

If you will observe a cycle of a single flower on your plant, you will note that near the center is a very fine, short green stalk-like structure protruding slightly above the surrounding rosette of cigarshaped anthers. This protruding structure is the style of the pistil with the very small sticky pollen

receptive stigma at its tip. You will observe that within a scant 2-3 days, this stigma tip turns from green to brown, indicating that it is drying and therefore no longer pollen receptive. We will, therefore, write this flower off for seed production. But we will use the anthers for pollen.

In a few days when the next flower opens on your stalk, or on another plant, you must act quickly. As soon as the tepals (petal-like structures) are fully spread, you must pollinate before you lose the stigma. Remove several anthers from the first flower and holding five or six of them between thumb and forefinger, gently pull them open with the thumb and forefinger of the other hand. If you gently tap or rub the torn open ends of the anthers on another fingertip, you will observe a very small quantity of yellow-white dust-like pollen. You do not need much.

Gently tap your pollen covered fingertip on the just opened, sticky stigma of the second flower, touching the stigma in the process. if you are in doubt and want to experiment, also touch or dab the open ends of your anthers on this stigma, but do not overdo stigma contact or you may damage it.

Basically, that is all there is to it. You simply continue on with this process as succeeding flowers open on your stalk or between multiple Stalks, using the anthers of older flowers for pollen sources for fresh stigmas. If you have access to tuning forks of varying frequencies, you may wish to experiment by touching the base of the vibrating tuning fork to a group of mature anthers in situ to see if you can mimic and find the right frequency used by bees when they "buzz" the flower. Seedpods will mature in 6-12 weeks. The base of the pistil (the ovary) should begin enlarging within a week or ten days of pollination, indicating successful fertilization.

As the ovary (now a seedpod) matures, it will finally change from pure green to a dryish looking brown green, and then begin splitting open "at the seams", as it were. You want to clip it from the stalk before it opens completely and sheds your seed all over the place. The seed may then be sown on whatever CP seed media you prefer. Germination does not require preceding stratification.

There have been several notes in various CP bulletins and meetings about *heliamphora* hybrids which have been successfully produced since these species are apparently as easily hybridized as *Sarracenia* spp. I would be cautious of flooding the CP world with too many real or claimed hybrids at this point. Oftentimes, the differences among many *Heliamphora* spp. are quite subtle, especially in the juvenile plants CP growers trade among themselves. This could result in a naming nightmare where many growers will never be quite sure what species or hybrids they have.

LITERATURE CITED—

Renner, S. S. 1989. Floral biological observations on *Heliamphora tatei* (Sarraceniaceae) and other plants from Cerro de la Neblina in Venezuela. PI. Syst. Evol. 163:21-29.

Schnell, D.E. 1974. More about the sunshine pitchers. Garden Journal 24:146-147. (First description of pollination in cultivated plants with instructions and photos.)