The Savage Garden: Dionaea muscipula cultivation and Sarracenia observations
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The Savage Garden

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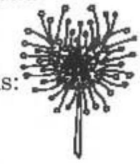

Keywords: chemistry — cultivation: *Dionaea muscipula* — observations: *Sarracenia.*

Venus Envy

Quite often at our nursery, visitors during the height of summer will marvel at the size of some of our display Venus Flytraps. While some of these plants have been in our collection for many years, even newly added ones—sometimes taken from our sales table—soon have traps considerably larger than they originally were.

The reason for this is simple. Rude fingers! Despite our signs begging, "Please do not tease the plants," there is something irresistible to those unfamiliar with this most famous carnivorous plant. They want to see the trap snap shut, and sign or no sign, they cautiously tickle the interior of the leaf and then squeal in delight at the sudden response. Of course, visitors who tease Venus Flytraps rarely buy the plants. And despite our policy of BYOB (Bring Your Own Bugs) and welcoming visitors to feed as many plants as they wish, provided they bring their own insects (we do supply forceps), most of these folks want instant gratification and do not want to hassle with stepping outside the greenhouse to rummage under logs and leaves to find a sowbug or two. So with stealthy behavior they stick their finger into a trap, triggering it empty. Then they usually spring one or two more. This misbehavior is particularly vexing when they step over to the sales bench and tease those plants, too. Most buying customers will not purchase a Venus Flytrap when all the traps are closed.

Of course, the folks who tease the plants do not realize it, but I think they are the reason our display plants get so big. Every time a trap is sprung, it gets larger. When two trigger hairs are touched, or one hair twice, an electrical stimuls causes the cells on the outside of the trap's lobes to stretch simultaneously. As the empty trap slowly reopens the next day, the cells on the inside of the lobes grow and stretch. The end result is a slightly larger trap every time the trap is sprung. Added to this the frequent meals the plants get, and the end result is larger and more vigorous plants. But the one disadvantage about teasing traps to get them bigger is that they can only close about six to ten times, after which they cease to function, turn black, and die.

Several years ago Joe Mazrimas told me an interesting story. He said there was a fellow who had won a blue ribbon in the early days of the San Francisco Flower Show for the biggest Venus Flytraps Joe had ever seen. "They were gigantic!" Joe exclaimed. "More like mousetraps than flytraps!" I asked Joe if he found out the secret of the grower's success, and Joe smiled slyly and told me the punchline.

"Every day or two he would stimulate only one trigger hair in each of the traps, without closing it," Joe explained. Apparently, the stored action potential, unreleased by a second stimulus, was enough to cause the cells to stretch slowly and grow. The result, awarded with a blue ribbon, was the envy of all who attended the show.

(*Could this be true? I am skeptical, but I am already designing an experiment to test it!—BAMR*)

One of the most intriguing things about *Sarracenia* is the effect of their nectar on insects. As those of us who grow the plants know, an insect who lands on a trumpet leaf and begins to feed on the nectar immediately loses much of its inhibition. The reaction is so instantaneous that one can only conclude that the nectar surely must taste good! While a housefly feeding on sugar or honey will quickly be startled by the shadow of an approaching hand, that same fly on a pitcher plant will sit and drink until a finger practically touches it. Even when it finally buzzes away, it often returns to the same spot in seconds.

The drug coniine has been isolated from the nectar and leaves of *Sarracenia purpurea* and *Sarracenia flava*, and this chemical is known to paralyze and kill small ants within minutes (see: Mody, N. V., Henson, R., Hedin, P. A., Kokpol, U., & Miles, D. H., 1976, Isolation of the Insect Paralyzing Agent Coniine from *Sarracenia flava*, Experientia (Basel) 32, 829-830). Sometimes I have seen dead ants in the hairs on the collar of purple pitcher plants. Some have theorized that fumes released by these pitcher plants are enough to intoxicate them.

I once had the unexpected pleasure of watching the complete effect of coniine on ants. Actually, it was not pleasurable at all, and has haunted me for many years! It is something you can duplicate and watch yourself, should you be so inclined. All you need is a healthy *Sarracenia flava*, an ant trail, and a magnifying glass.

My own observations came by accident. I had moved a yellow trumpet plant to my work bench of the greenhouse with the intention of later transplanting it. A pitcher leaf broke at the base in the process (it was snagged by a *Nepenthes* tendril) and the result was this lovely new trumpet toppling over, still attached to the rhizome. The lid and mouth area were now laying on the bench, virtually upside down.

The next day as I prepared to transplant it, I noticed the whole plant swarming with ants—a not uncommon thing. But what immediately caught my eye was the literal pile of dead ants on the bench where the broken trumpet lay. "Coniine in action!" I thought. Since the leaf was upside down, the ants feeding on the copious nectar were falling to the bench instead of down a normally upright tube. I was really startled at the number of dead ants, which must have numbered in the hundreds.

I grabbed my magnifying glass, and then a more power micro-lens, to get a better view of this horror. What I saw kept me transfixed at the spot for nearly an hour.

Ants that were feeding on the nectar fell, one by one, to the bench for an obvious reason. It was quite apparent that their legs were affected first. They would fall and quickly roll onto their backs, their legs literally crumpled above them. Their heads and abdomens wildly thrashed, antennae twitching furiously. But they were completely helpless, their legs folded up and not moving.

Healthy ants just arriving on the scene, following the trail of ant pheromones to the source of food, seemed quite concerned as to what was happening to their comrades. Their antennae inquisitively probed the stricken ants' bodies from "head to toe," so to speak. Sometimes two or three healthy ants scurried about one ill ant, as though they were deeply concerned.

I watched as all the dying ants behaved in the same manner. After the legs crumpled up, the thumping abdomen was the next to become paralyzed. Soon the whole body lay still, except for the head, which twisted and turned, its mandibles

snapping, its antennae flailing about.

Soon the head, too, ceased to move, except for the twitching antennae. In fact on all the ants it was their antennae that were the last to go, feebly jerking and twitching until they, too, stopped.

Many of the healthy ants carried away the frozen bodies of their siblings. Others went on to the deadly nectar and followed the fate of their brethren. It took each afflicted ant about fifteen minutes to half an hour to die. Hideously.

Ah...the joys of carnivorous plant growing.

ICPS World Conference 2000 News: Call for Abstracts

Due to space restrictions, the 2000 conference will not be able to have a poster paper session. However, field and laboratory researchers, horticulturists, conservationists, and other authors can submit a short summary of their recent work for inclusion to the proceedings volume that will be produced by the 2000 conference. This call for abstracts is not limited to conference attendees.

Abstracts should be 400 words or less, no photographs, in English. Electronic submissions are preferred, but clear computer/typewriter copy (12 pt, Times font) is acceptable. Include an abstract title, your name, and your mailing address. Send your abstracts to David O. Gray, Conference Registrar, 584 Castro St. # 687, San Francsisco, CA 94114 or via e-mail (davidogray@aol.com).

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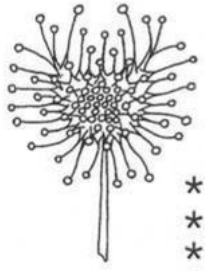

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