



DrummondV

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- Conservation through Stewardship -

Letter from the Editor

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Drummondii is the quarterly newsletter of the North American Sarracenia Conservancy. For more information, visit our website: <http://nasarracenia.org>

Noah Elhardt
Director of PR and Education

Spring is in the air! Spring is a busy time of year for everyone, perhaps none less than for the avid gardener. For those of you growing *Sarracenia*, your plants have been greeting the spring sun with flower buds, ever reaching for the sky on their stout stalks before finally bending their nodding flowers



Sarracenia leucophylla Photo © Noah Elhardt

back toward the earth. The pitchers themselves are not far behind, seemingly trying to out compete the flowers themselves in a test of height and splendor.

Do you plan to hand pollinate your flowers this year? If you want to produce seed from location data plants, you have good reason to do so! Check out the pollination guide on our website for more info on how to do this.

In this issue you can learn about an insect that has turned the tables on North American pitcher plants. Also check out news of our upcoming fundraiser auction, and see some of the latest stats from our growing collection here at the North American Sarracenia Conservancy!

Invaders from within

By Brooks Garcia

The North American Pitcher Plants of the genus *Sarracenia* have a number of natural pests, such as mealy bugs, scale, aphids, rhizome borers and thrips. But one of the worst and most destructive are *Exyra* moths. The interesting thing about *Exyra* moths is that, as far as we know, they only feed on *Sarracenia*, making them as threatened as the plants themselves.

Unlike some of the other mentioned pests, *Exyra* moths make themselves known fairly quickly; it still could take a season or two to eradicate them from a collection.continued on pg. 4



Exyra semicrocea

Photo © Hannah Nendick-Mason

Sarracenia in Science

- version 2.007 -

Editor's note: In what I hope to make an annual feature, I here give an overview of scientific findings related to North American pitcher plants published in peer-reviewed journals. The following findings were published in 2007:

- Researchers from the University of Florida studied the effects of ant activity and *Exyra* moth herbivory on the health of *Sarracenia minor* in a field study in Florida. They introduced PVC pipes - used by ants as nest sites - adjacent to half of the plants in the study. To look at the effects of herbivory, half of the plants were caged to keep out *Exyra* moths. Caging significantly increased the “size, number, and quality of pitchers.” Ant attendance also had a positive correlation with plant health. Ants provide two benefits: directly as a food source and indirectly by reducing herbivory by other insects such as *Exyra* moths.¹
- *Sarracenia* species use self-produced enzymes to digest insect prey. The extent to which this digestion is aided by enzymatic activity from microbial communities that build in the trap water is still being researched. Researchers from the University of North Florida studied the microbial community in 93 *S. minor* plants. They isolated 24 and 36 unique strains in the first and second year of the study, respectively. Since the fluid of unopened pitchers is sterile, these bacteria were likely introduced by insect prey. In addition to producing digestive enzymes, some of the bacteria identified are known to fix atmospheric nitrogen, a possible additional source of this element for the plant. Identified isolates included *Serratia marcescens* (found in 27.5% of pitchers), *Achromobacter xylosoxidans* (37.6%), *Micrococcus luteus* (40.9%), *Bacillus cereus* (10.2%), *Lactococcus lactis* (17.2%), *Rhodococcus equi* (2.2%) and *Bacillus thuringiensis* (5.4%).² I wonder if the *Bacillus thuringiensis* helps prevent *Exyra* predation?
- The leaves of the purple pitcher plant, *Sarracenia purpurea* have been observed to have a higher nitrogen (N) content than is typical for its photosynthetic rate, the rate at which it uses sunlight to produce carbohydrates. In an article released in the October issue of *Functional Ecology*, researchers J. L. Butler and A. M. Ellison published the results of their study investigating N cycling in *S. purpurea*. Of the available N (mainly from dissolved prey and NH₄ and NO₃ in precipitation), 55-69% was assimilated, or stored, in plant tissue for future use. This stored N is especially important in the beginning of the season, when the plant is producing its first functional traps. While most plants can acquire nutrients from the soil they grow in, *Sarracenia* must rely on stored nutrients in the spring until prey digestion is under way.³



Sarracenia minor

Photo © Noah Elhardt

1. Moon, D, Moon, J., Depaz, J., Elias, S., Wheeler, E., University of Florida, *The effects of increased ant attendance and reduced herbivory on the hooded pitcher plant Sarracenia minor*, Abstract contributed to the ESA/SER Joint Meeting (August 5-10, 2007).

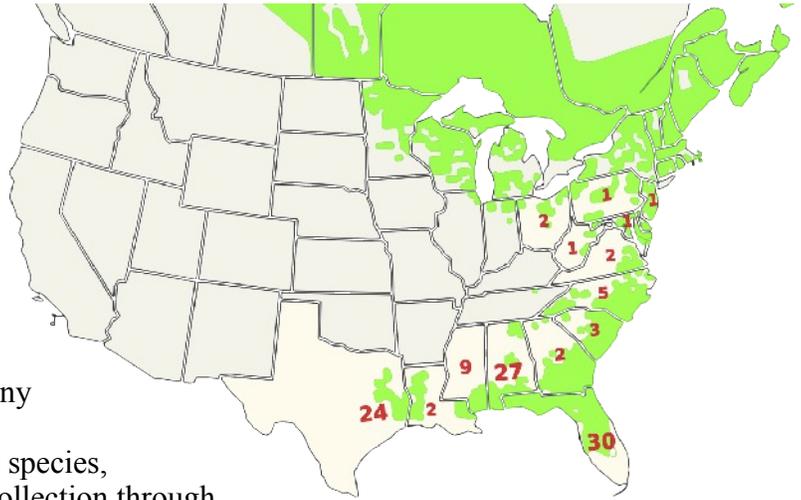
2. Siragusa, A. J., Swenson, J. E., Casamatta, D. A., *Culturable Bacteria Present in the Fluid of the Hooded-Pitcher Plant Sarracenia minor Based on 16S rDNA Gene Sequence Data*, Microbial Ecology, Volume 54, Number 2 / August, 2007

3. Butler, J. L.; Ellison, A. M., *Nitrogen cycling dynamics in the carnivorous northern pitcher plant, Sarracenia purpurea*. Functional Ecology, Volume 21, Number 5, October 2007 , pp. 835-843(9)

Field Survey Progress

One of the main foci of our work in the NASC has been to catalog field locations with extant natural *Sarracenia* populations. This helps us better understand the fitness of the natural populations of various species in different parts of their ranges. This will allow us to more accurately prioritize conservation work.

We now have 103 sites in our database, distributed by state as shown to the right. At many sites, members have recorded further ecological information such as population size, companion species, stand health. Genetic sampling for the NASC collection through seed collection has been performed at some of these sites, as allowed by seed availability (sampling is avoided if seed set is low) and legality. If you live near *Sarracenia* territory (marked in green on the map above) and want to get involved in these surveying efforts, please contact Mark Todd, Head of Conservation, at conservation@nasarracenia.org.



Meet our newest NASC board member!

JC Stoner joined the NASC board of directors during the annual election in January.



James Stoner
Head of Distribution

My name is J.C. Stoner, newly elected Head of Distribution for the NASC. I am the Coordinator for Residence Life at the home campus of Park University.

Besides overseeing the daily operation of residence life at Park, I work to provide opportunities for outside of the classroom growth, education, and development of the student population.

Joining NASC appealed to me for a variety of reasons. The first reason was the camaraderie I discovered online with those that share my interest in carnivorous plants and the ever important goal of conserving the depleting ecosystems that the plants live in. Secondly, since education has always been important to me, I find

the mission of NASC to be right up my alley. From my experience, education truly is the underlying principle behind change and community growth.

As Head of Distribution, I plan to work with Mike Howlett, Head Grower, and the rest of the Growing Committee to establish and maintain strong and accurate records of NASC's seed bank inventory while ensuring that all plant material is being properly represented in growth for eventual reintroduction. Through my current job I track students and assign rooms, so I am positive that I can do the same with plants. After all, there really isn't much of a difference between plants and college students, right? Well, I intend to find out!

I can often be found loitering around at Terra forums under the handle "xvart." I also enjoy reading science fiction and fantasy books and exploring the world around us.

Benefit Auction

Donate and win carnivorous plants to support conservation

Our annual fundraiser auction, currently the #1 way we fund our conservation efforts, will be held this year from

June 7-21st. As in previous years, the auction will be held at Terraforums, and will feature donated carnivorous plants and other items. This year, 50% of the proceeds will go to the Splinter Hill Bog purchase campaign, with the remainder funding NASC initiatives and programs. Find out more about how to donate or bid on items by visiting www.terraforums.com.



continued from page 1.....

In the wild, fire and natural predators such as birds help to control them to a manageable level. To avid collectors, however, the destruction of a single pitcher on a prized plant may be sufficient a cause for control methods to be implemented. There are several ways *Exyra* moths can infest a collection: from wild collected plants; housing a collection in close proximity to a native stand; or from purchased or traded material that is already infested.

In order to eliminate *Exyra*, it is important to understand the life cycle to know the most vulnerable time in which to strike and be successful. The adult female moth hides in the pitchers during the day. She is half beige and half brown (see photo on pg 1). They have hooks on their front feet that allow them to hide down in the pitchers without slipping. At night, they make short flights from pitcher to pitcher depositing a single egg just inside the lip. The egg soon hatches into a voracious caterpillar that feeds on the lining of the pitcher and weaves a web across the opening. This allows the larva to feed in peace and keep the pitcher from filling with water. Sometimes a drainage hole is made at

the bottom of the pitcher to facilitate this. Often times a single caterpillar will feed on several pitchers, moving to larger ones as it increases in size. The pitchers either collapse, fold over or look shredded. The larvae are red and black striped and somewhat prickly looking. They hide way down in the pitchers. I have found it impossible to control the adults, so I attack the young caterpillars. I remove and destroy all the pitchers every year in January or February before the last season's caterpillars become active with the first warm days. I either bag them and throw them away or burn them. I use BT, (*Bacillus thuringiensis*) a harmless bacteria that kills the caterpillars. It is readily available at garden centers.



Exyra ridginsii

Photo © Gretchen Waggy

This mixture must be applied inside the pitchers where the caterpillars are feeding. I find it almost easier to daily patrol the plants and crush the offenders by hand. I find it very satisfying.

Here is wishing you never have this problem. Hopefully, though, the information contained here will help you in the event of an outbreak of the *Exyra* moth. Good growing.

Editor's note: NASC publishes its newsletter on a quarterly basis. Due to time constraints and insufficient material, a winter issue was not published. We welcome article submissions, photos and other *Sarracenia*-related material. If you are interested in joining the editorial team to assist with the NASC newsletter, please contact the editor, Noah Elhardt at publicrelations@nasarracenia.org.

Upcoming Meeting Dates

Official NASC meetings are held monthly on the second Thursday of each month, at 8 P.M. CST. Unofficial meetings are held every Thursday night at the same hour. To attend a meeting, download the AIM chat program from <http://aim.com> or use web based client at <http://meebo.com/>. Then email your screen name to Suzanne Hedderly at president@nasarracenia.org. Log on to AIM at the correct time and you will be invited to the NASC chat room.

May 8th - June 12th - July 10th
August 7th - September 11th - October 9th

5 ways YOU can join the NASC in its efforts:

- Become a member! There is a \$10/year fee. You can now apply for membership through our website, <http://nasarracenia.org>.
- Live near *Sarracenia* habitat? Help us locate remaining populations. You can download a field survey form at <http://nasarracenia.org/forms/NASCsurveyform2.pdf>. Members can also join the Conservation Committee and help with rescue and sampling work.
- Join the PR Committee and help raise public awareness of *Sarracenia* and their plight.
- Do you have the resources and know-how to grow out *Sarracenia* seedlings? Join the Growers Committee and help preserve genetic diversity through cultivation.
- Stop by one of our weekly or monthly meetings (schedule at right). It's a great way to get more familiar with who we are and how we work.



NASC snapshot: Location data Sarracenia seedlings growing under the care of Head Grower Mike Howlett near Houston, Texas. Photo © William Huynh

NASC Board Contact Information

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