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CARNIVOROUS PLANT NEWSLETTER

Journal of the International Carnivorous Plant Society

Volume 32, No. 1

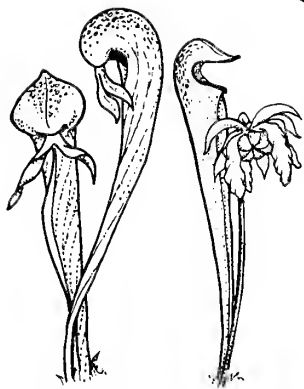
March 2003



CARNIVOROUS PLANT NEWSLETTER

Journal of the International
Carnivorous Plant Society
www.carnivorousplants.org

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March 2003



Front Cover: *Sarracenia* 'Chas' Brew'. Photograph by Stefan Ploszak. See article on page 24.

Back Cover: An idealized profile through the Andean mountain range with the dominating Chimborazo in the centre, with the barometrically measured altitudinal vegetation zones, and the sites of the most important plants observed or collected; you will find the words "*Pinguicula loxensis*" to the right of and slightly below the clouds shown on the mountain slopes. See article on page 14.

Carnivorous Plant Newsletter is dedicated to spreading knowledge and news related to carnivorous plants. Reader contributions are essential for this mission to be successful. Do not hesitate to contact the editors with information about your plants, conservation projects, field trips, or noteworthy events. Contributors should review the "Instructions to Authors" printed in the March issue of each year. Advertisers should contact the editors. Views expressed in this publication are those of the authors, not the editorial staff.

All correspondence regarding dues, address changes and missing issues should be sent to the Membership Coordinator at the ICPS. Do not send such correspondence to the editors. Checks for subscriptions and back issues should be made to the ICPS in US funds. Dues for 2003 are \$25.

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INTERNATIONAL CARNIVOROUS PLANT SOCIETY SEED BANK

ICPS Seedbank • P.O. Box 72222 • Davis, CA 95617-6222 • USA

- | | |
|--|---|
| <i>Byblis liniflora</i> | <i>D. intermedia</i> |
| <i>Darlingtonia californica</i> —Oregon, USA | <i>D. intermedia</i> —Cuba |
| <i>Dionaea muscipula</i> | <i>D. intermedia</i> —Germany |
| <i>Drosera aliciae</i> | <i>D. intermedia</i> —New Jersey, USA |
| <i>D. anglica</i> —Alaska, USA | <i>D. intermedia</i> —North Carolina, USA |
| <i>D. anglica</i> —Germany | <i>D. nidiformis</i> |
| <i>D. binata</i> | <i>D. rotundifolia</i> —New Jersey, USA |
| <i>D. binata</i> —Coromandel, NZ | <i>D. spatulata</i> —Kanto |
| <i>D. brevifolia</i> | <i>D. stolonifera</i> subsp. <i>stolonifera</i> |
| <i>D. burmannii</i> | <i>D. tokaiensis</i> |
| <i>D. capensis</i> —narrow leaf | <i>Pinguicula caerulea</i> |
| <i>D. capensis</i> 'Albino'—white flower | <i>P. primuliflora</i> |
| <i>D. capensis</i> —red leaf | <i>Sarracenia flava</i> |
| <i>D. capensis</i> —wide leaf | <i>S. leucophylla</i> |
| <i>D. capillaris</i> | <i>S. psittacina</i> |
| <i>D. collinsiae</i> | <i>S. purpurea</i> subsp. <i>purpurea</i> |
| <i>D. dielsiana</i> | <i>S. purpurea</i> subsp. <i>venosa</i> |
| <i>D. filiformis</i> var. <i>filiformis</i> | <i>S. rubra</i> subsp. <i>gulfensis</i> |
| <i>D. gigantea</i> | <i>Sarracenia</i> —complex hybrid seed |
| <i>D. glanduligera</i> | <i>Utricularia multifida</i> |
| <i>D. hartmeyerorum</i> | |

This is a partial list of the seeds available. A complete list is online at the ICPS web site, <http://www.carnivorousplants.org/> or by sending a self-addressed, stamped (if USA), envelope to the seed bank address.

Seed packets are US\$1 each. Please include US\$3 postage and handling for each order. You may pay by cash, check, or money order in US\$. Many members pay with cash. Please make checks and money orders payable to "ICPS Seed Bank".

The seed bank is a members-only benefit. The quantity of seed available to each member is 1 packet of each variety per month and 40 packets total in any 12 month period. Please list alternative seed selections, as other orders will arrive before yours. If you have an e-mail address, please include it so we can correspond should any issues arise. Seeds purchased through the seed bank are intended for your personal use only and may not be sold.

You are encouraged to stock the seed bank with seed produced by cultivated plants. The ICPS policy on wild seed collection is on line at the ICPS web site. Cultivation-produced seeds of species protected by the US Endangered Species Act are distributed within the US only, and in accordance with the ICPS's US Fish & Wildlife Service permit.

Donate seed and get credit for free seed from the seed bank. Seeds of selected varieties are available free to teachers for use in the classroom and to scientists and conservation organizations. It is ICPS policy not to sell internationally seed of plants protected by CITES Appendix I or the US Endangered Species Act.

John Brittnacher, Manager • john@carnivorousplants.org

SARRACENIA DISTRIBUTION PROGRAM

BARRY RICE • ICPS Director of Conservation Programs • P.O. Box 72741 • Davis, CA 95617 • USA • barry@carnivorousplants.org

Keywords: conservation, poaching — *Sarracenia alabamensis*.

If you are an enthusiastic *Sarracenia* collector, read this article!

At a meeting the ICPS funded to help stewards of rare *Sarracenia* populations exchange information on management techniques (Meyers-Rice, 2001), I discovered that hobbyist interest in rare pitcher plants, especially *Sarracenia alabamensis*, *S. jonesii*, and *S. oreophila*, might contribute to poaching pressures. I resolved to develop legal ways to make these plants more available to carnivorous plant enthusiasts. These *Sarracenia* species are not easily available because their interstate trade is prohibited without permits from the United States States Fish and Wildlife Service (US F&WS), and international trade is prohibited without CITES permits.

As a first step in making rare *Sarracenia* available, the ICPS needed to complete the process of obtaining its 501(c)3 nonprofit status. Former ICPS President David Gray guided that process to fruition last year. With our nonprofit status affirmed, I was then able to apply for two trade permits from the US F&WS. The first permit was to give our seed bank permission to distribute seed from cultivated specimens of endangered species (see the new guidelines on page 29). The second permit was to give the ICPS the chance to experiment in a short-duration, live plant distribution program in which rare plants would be provided to ICPS members. I am pleased to announce that both permits were approved. Read on to learn more about the live plant distribution program, and how you can apply to legally obtain rare *Sarracenia*.

The plants being distributed are all specimens of *Sarracenia alabamensis* (i.e. *Sarracenia rubra* subsp. *alabamensis*). *Sarracenia alabamensis* is believed to occur in only twelve locations in the wild, and the ICPS has been given seeds by the land owners from three of these locations. As described in Meyers-Rice (2001), we are referring to these locations using site codes: AL001, AL002, and AL003. (General descriptions of these sites are on the ICPS web site and the carnivorous plant FAQ, e.g. <http://www.sarracenia.com/faq/faq3978.html>).

These seeds were germinated in my own and John Brittnacher's terraria, and as they developed were transferred to the Botanical Conservatory greenhouses at the University of California at Davis, with the kind cooperation of Tim Metcalf, the greenhouse manager. Additional support has been provided by University of California at Davis staff Ernesto Sandoval, Doug Walker, and also many interns and volunteers (my wife Beth Salvia, for example!). ICPS board member John Brittnacher has in particular contributed many additional hours to the cultivation of these plants.

More Details On These Plants

The seedlings have different cultivation histories so they are of different sizes. However, even the smallest are at least 4 cm (1.5 inches) tall. Since each plant in the program was grown from a separate seed, they are all genetically distinct. The plants are all responding well to standard *Sarracenia* horticultural methods. Prior

to shipping, the plants were housed in greenhouse facilities that use integrated pest management practices, so pests are at a minimum. However, the fastidious cultivator should be on the watch for pests.

Using the distribution protocol described below, we will send pairs of plants to as many people as possible until our stock is depleted. I encourage growers to request plants from two different provenances. It is my hope that this will supply growers with plants genetically distinct enough to avoid inbreeding depression and to produce a great amount of seed if the two plants are crossed.

Prior to shipping, the plants will be removed from their pots and have their roots washed free of soil. They will be packed in sphagnum moss. Even though we will take every possible precaution to treat the plants delicately, this treatment may result in damage or even the death of some plants. Treat the plants with care upon their arrival and pot them immediately.

Each plant will be accompanied by paperwork indicating they originated from this ICPS poaching abatement distribution program. I will retain records on who was sent plants in this program; this information will help document the success of the program so that future permits can be obtained from the US F&WS.

Request Processing And Fulfillment

Here are the instructions on how to request plants. Please note that requesting a pair of plants does not guarantee you will receive them—I expect demand may exceed supply on this first trial of the program. This is why I use the terminology “plant requests” instead of “plant orders” throughout this article. We have set a request-cost of US\$7 for two plants to be an at-cost proposition to pay for shipping materials. Any profit from this program will be directed to the ICPS conservation program, any deficit will be paid for by the ICPS conservation program.

We regret that only US members may request plants on this trial program. If it is successful, we may repeat it with larger membership participation.

- 1) Send above a payment of \$7 US dollars to my ICPS P.O. box address (given above); send either a check (written to “ICPS”) or cash (at your own risk).
- 2) Include with your payment the request form (on page 6) that will guide our fulfillment of your request (photocopy the form to avoid having to cut apart your issue of the journal). Include your name so we can compare it to the ICPS membership roster—you must be a current member of the ICPS to participate in this program. Also, include a copy of your mailing address on a piece of paper 5 cm × 10 cm (2 × 4 inches). This will be used as a mailing label, so make sure it is legible, extremely clear, and smear-proof.
- 3) Requests will be accepted until 1 June 2003. At that time, we will randomly assign a number to each request. Requests for plants will be filled in this order. Requests received after 1 June will not be processed. You may only request two plants.
- 4) Plants will be selected randomly to complete the requests. The plants are of various ages and cultivation histories, so while the smallest are only 4 cm (1.5 inches) tall, others are substantially larger.
- 5) If the plant request demand exceeds our supply, your payment will be returned in June or July. Cash payments will be returned as cash—you assume all risk related to money lost in the mail.

6) You may choose to include an additional charitable, tax-deductible donation to the ICPS conservation fund with your plant request; such donations will have no effect on your chances of obtaining plants if the demand exceeds our supply. If you pay by check, please make this donation on a separate check.

7) Do not include correspondence regarding the seed bank or your ICPS membership with your plant request.

8) Please do not mail, e-mail or phone me about the status of your request. This will be a very time-intensive project, and I will not have time to answer your questions.

9) Although we will be gentle with the plants, they will probably suffer some shock in the trip from our facilities to yours. We can not afford to offer refunds for plants that do not survive.

ICPS Rare Plant Request Form

Your name: _____

Plant selection preference: choose one

- I would prefer two plants from the same site
 I would prefer one plant each from two different sites
 I have no preference

Payment enclosed as: Cash Check (Payable to ICPS)

Optional charitable donation to ICPS conservation program

Amount: _____ Paid as: Cash Check (Payable to ICPS)

Remember to include your payment and legible copy of your name/address that will be used as a shipping label.

Future plans

Those who obtain plants through this program are encouraged to keep the paperwork that will accompany each plant. This paperwork will be useful in case you are ever questioned by authorities about where and how you obtained your plants. (Anyone who grows endangered species should maintain documentation regarding their plants.) I encourage everyone to cross pollinate their plants and glut the ICPS seed bank with seed. The CP listserve on the internet would be an excellent way for people to share news of excess pollen.

This is a trial program. I am organizing this to both help the plants by decreasing poaching, and to help the carnivorous plant grower community by making plants more easily available. As with all first-attempts at innovative programs, I expect we will encounter some difficulties and snags—I truly hope those who participate in this program are willing to be understanding if and when we encounter problems.

I will probably conduct a follow-up survey to discover how many plants survive the shipping process. These survey questions will probably be included on the ICPS membership renewal form. The feedback from participants who obtain plants through this program would be helpful.

If this program is a success, and if it is not too burdensome, we may repeat it in the future with other rare taxa, or plants from other locations. Extending the program to include our ICPS members who are not located within the USA would be

excellent, but this would involve obtaining CITES permits. Whether this program is revived mostly depends upon whether it appears to benefit the plants, and whether or not these best-laid plans, created with the best intentions, are not devastated by unintended consequences.

Meyers-Rice, B. A. 2001, Rare *Sarracenia* poaching and the ICPS, Carniv. Pl. Newslett., 30:43-50.



Figure 1: Plants in our University of California facilities, awaiting distribution. Photograph by John Brittnacher.

LOOKING BACK: CPN 25 YEARS AGO

David Moran described an experience he had with *Nepenthes* under adverse conditions: "I have one *Nepenthes kamptiana* growing in a 7-inch (18 cm) pot outdoors under a lath along with my orchids....In January, 1977, the temperature dropped to 25°F (-4°), and the plant suffered freeze damage but did not perish. I took several cuttings which rooted and are not growing satisfactorily at this time. I was surprised that this tropical plant survived a 'hard freeze.'"

AMAZING THAILAND

TOM KAHL • 8219 South 130th Street • Seattle, WA 98178-4945 • USA •
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Keywords: travelogue: *Nepenthes anamensis*, Thailand.

A new trip—this time to Thailand! I had previously taken a photo of a herbarium specimen at the Royal Herbarium in Bangkok and wanted to see the plant in the wild, alive. The sample was of a *Nepenthes* from Phu Kradung, a high mountain plateau in Northeastern Thailand.

Before heading to Phu Kradung I wanted to visit a nursery owned by a person I know named Toong. Toong sold *Nepenthes* in Bangkok and had a large collection of Thai species from all over the country. I bought a couple of interesting *Nepenthes*, and then prepared for the next part of my trip.

So there I was in Thailand's Bangkok bus terminal. As I climbed onto the bus I recalled my wife's nephew telling me to get off at Panukao. Then, Davee told me, I must take a *songao* (public transport) to Phu Kradung.

"OK," I thought to myself, "Panukao, *songao*, Phu Kradung." I had it memorized, no problem.

Stepping into the overly air-conditioned bus I could feel the temperature plummet. Déjà vu—this was just like the sprinter train trip to I took to Chiang Mai on my first visit—I should have brought heavier clothes. The bus travelled on and on into the night. After about the 6th or 7th stop along the way I became concerned about when I should get off. Panu-what? The bus stopped again, and feeling a little brave (or desperate) I whipped out my Thai language phrase book and asked in my hillbilly twang "Is this my stop?" to one of the student passengers. In perfect English, the student replied, "Yes we are all going to Phu Kradung."

The bus arrived in Panukao near dawn. Hopping onto the *songao* heading for Phu Kradung, the sunrise was spectacular as it shone onto the hills surrounding Panukao!

At the park headquarters, after a brief check in, I loaded my pack onto a *Luk Hop* (porter). Well-marked trails led up towards the summit. Many people travel to the top and today was no exception—it was a very sociable hike. Since the scenery was outstanding, I took my time going up, and I was nearly the last one to arrive at the 1288m (4226 ft) summit just before dusk.

The next morning, I took a short 4 km (2.5 mile) hike to check in at the ranger station. During this hike, I came across my first *Nepenthes anamensis* on Phu Kradung—a mere 300 meters down the trail. Oh what a sight, as the plant fits its name!¹ Overcome with joy, I jumped into the bush with camera in hand for a closer look (Figure 1, on left).

After a while it started getting dark, and I had decided I had better check in at the ranger station. As I trodded along the trail I felt something odd in my shoe—yes, land-leeches. I took off my shoe, and after a quick flick I was on my way. Back at the ranger station, the staff was kind enough to give me a travel map, and also more locations for pitcher plants.

The next day I started on a trek that looped around west towards the cliffs. This trip passed through a pine forest and a peat bog. *Drosera burmannii* was growing

¹*Nepenthes*: a drug mentioned in the Odyssey, fabled to drive away care and make people forget their woes—*Ed.*



Figure 1: *Nepenthes anamensis* in Thailand.

in sandy areas, while *U. bifida* and *U. delphinioides* grew along the trail within pools and depressions in the peat bog.

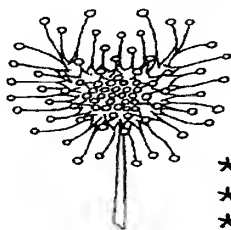
Nepenthes covered most of the plateau every 5-15 meters (Figure 1, on right). The populations were heavier along the cliffs. Retiring back to my bungalow that evening I set out the next morning to see the famous sunrise at Nok An's cliff. Many other campers were already waiting. We all sat on the cliff's edge, shivering until the sun came up. What a sight! I spent the rest of that day visiting waterfalls.

Returning to Bangkok I had the pleasure of visiting the Rama IX Botanical Park on Thailand Father's Day (December 5th). Kasem Chandraprasong was a horticultural consultant for the park, and I was pleased to visit with him. I wandered across the park's fabulous 80 hectares (200 acres)—filled with hundreds of thousand of families celebrating the holiday. A fitting finale to wonderful trip.

I would like to thank all my friends in Thailand, especially the Nacharung family, for making this trip the best ever.

—The editors wish to thank Heiko Rischer for confirming the identity of the species of *Nepenthes* that Tom saw on his interesting trip to Thailand.

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BOOK REVIEW



Clarke, Charles. 2001. *A Guide to the Pitcher Plants of Sabah*. Natural History Publications, Borneo. 983-812-057-X, 45 p., approximately 70 color photographs, figures and maps. Paperback, 18 × 25 cm (7 × 10 in), \$US6.00, shipping extra.

Reviewed by Michael Catalani

Normally when you think of a *Nepenthes* book written by Charles Clarke, a large scientific work comes to mind. But not so with this little gem. Specifically aimed at tourists and visitors to the Sabah area, “A Guide to the Pitcher Plants of Sabah” uses much less scientific terminology than Clarke’s two larger works, “*Nepenthes of Borneo*” and “*Nepenthes of Sumatra and Peninsular Malaysia*.”

Even so, this book does cover many of the same subjects as his two larger works, but in a more condensed form. The first section of the book gives a description of *Nepenthes* architecture, prey capture and digestion, complemented appropriately with accurate line drawings. Clarke also describes the different habitats in which the plants can be found, which would prove to be quite useful on a trek through the area. The second section describes each of the twenty species and five hybrids which can be found in the Sabah area, and these are accompanied by beautiful color photos. The third section of the book tells where you can find many of the species. Some of this information is general in nature, whereas others name particular sites and their approximate locations. He also states if local guides are likely to be familiar with these sites and could help you find them. For those wanting to view *Nepenthes* without the tedious hiking, Clarke mentions the two gardens of Kinabalu Park and the gardens of Mesilau Resort. At these gardens you can find many species such as *N. edwardsiana* and *N. burbidgeae* in a semi-natural setting.

Using this guide, visitors to the Sabah area will have no problems correctly identifying each of the *Nepenthes* species they may come across. The overall layout of the book is beautiful. I had to continually remind myself that the book was created simply as guide for visitors, because the end product is really more than that. The dual staple binding of the heavy semi-gloss pages is durable, and should withstand the abuse it will take while on the trails of Sabah. The text font is adequate in size, and the layout of the text flowing among the many color photos makes for very easy reading. The book appears error free other than a single grammatical error on page 1 in which the word “only” was inserted into a sentence which described *N. edwardsiana* as being “found only on Mt. Kinabalu.”

For those folks who would like a less technical book than “*Nepenthes of Borneo*”, “A Guide to the Pitcher plants of Sabah” is an excellent alternative choice. The photos are simply incredible, and the book covers important information such as natural habitats. Indeed, it is somewhat like a condensed version of “*Nepenthes of Borneo*”, but rewritten in less scientific language. Since this book contains many new photos of *Nepenthes* in the wild, most carnivorous plant book collectors and *Nepenthes* fanatics will enjoy it for that reason alone.

Interested buyers should contact the publishers at Natural History Publications, A913, 9th Floor, Phase 1, Wisma Merdeka, P. O. Box 15566, 88864 Kota Kinabalu, Sabah, Malaysia.

“DISCOVERING” CARNIVOROUS PLANTS

JOHN GREEN • Salt Lake City, Utah • USA • <http://www.cc.utah.edu/~jsg16/cp.htm>

Keywords: cultivation.

It goes without saying that carnivorous plants, for all their beauty and benefits, are not the most popular plants in cultivation. Perhaps it is because they require slightly different growing conditions than some. More likely it is their carnivorous nature—plants that are full of the carcasses of dead insects certainly have a different appeal than most cultivated plants. They are usually regarded as freaks of nature.

Unfortunately, so are those of us who grow them. Years ago, when I was single, I learned it was best not to mention my hobby on dates. No matter how much a girl likes plants or flowers, she is rarely impressed by the revelation that you grow carnivorous plants. I also learned to keep mostly quiet about my plants at work, no matter how excited I was about the newest addition to my collection. Most people look at you a little differently when you have just said you grow plants that eat bugs.

But don't get me wrong—I am not embarrassed that I grow carnivorous plants. Given the chance I will bore a person to tears talking about them (just ask my wife!). But I realize that most people do not share this passion for these marvels of nature. So when people talk of increasing the popularity of carnivorous plants in cultivation I wonder if we should even bother. The only market segment consistently attracted to them is young people. Kids are naturally curious about such fascinating and unusual plants and will not be grossed out or turned off by dead bugs. Maybe the best thing to do is make sure they have good growing information.

I got interested in them myself as a kid when I saw ads for flytraps in comic books and magazines. I wondered if such a plant could be for real. I had already found out the hard way that such advertisements were often misleading. The “1,000 Army Men” I purchased turned out to be cheap little flat things, and the “foot locker” they were supposed to arrive in was really only a tiny little box. Even worse, the “sea monkeys” did not even remotely resemble the little people in the advertisements. So I was wary enough not to send in my hard-earned money from mowing lawns. But all that changed when I saw a film about carnivorous plants in a 9th grade biology class. I was hooked.

The problem then became finding the plants. I managed to pick up a flytrap at a local nursery. I was completely fascinated watching the trap snap shut on a piece of ground beef. But the plant did not last long because I did not know about or understand its requirements for light and water. The same thing happened with the pitcher plants I was occasionally lucky enough to find. But I never forgot those feelings of fascination when I first saw these strange plants.

I was recently reminded of this by my Boy Scout troop. As their scoutmaster I had run out of things for them to do one evening. Some of them had expressed interest in my plants so I decided to let them pot up some extras to take home. I was pleasantly surprised a few weeks later when one of the boy's parents enthusiastically told me how well the plants were growing in their kitchen window, and that for his birthday their son had requested more carnivorous plants and a book about how to grow them.

So it has been fun to see his excitement and desire to learn more. I only regret that my own children are so accustomed to them in our home that, although they love showing dad's “bug plants” to their friends, I wonder if they have had the same feelings of amazement and wonder I had when I first watched a flytrap close or looked down the tube of a pitcher plant.

ICPS WILD SEED COLLECTION POLICY

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Keywords: conservation: ethics, seed bank.

The ICPS maintains a policy that field collection of live plants is not justified in most cases. Carnivorous plants are often in small populations, and the removal of live plants can reduce the genetic diversity of a site and impair the long-term viability of native plant populations. Even plants that once existed in large, landscape-level stands are being reduced to small, fragmented populations because of human pressures. However, the ICPS has never explicitly articulated policies regarding the collection of seed for its seed bank. We hope this set of guidelines helps clarify the ICPS's stance on ethical seed collection. The ICPS recognizes and appreciates the comments provided by staff of the US Fish & Wildlife Service, The Nature Conservancy, and Natural Heritage Programs—these comments were helpful in refining these seed bank guidelines.

1) Gather only enough seed to establish the plant in your own and a colleague's collection. Use the collected seed as parental stock to produce seed for the ICPS seed bank.

2) Minimize your collection impacts by removing only a small percentage of the total seeds available from a site. A good rule of thumb is to collect seeds from only 1 in 50 fruiting plants; do not collect if less than a total of 50 plants occur in a site. It is particularly important not to over-collect seed from plants that reproduce primarily by seed. Small amounts of seed from several plants is better than a large amount of seed from one plant, since the genetic diversity in the collection will be higher, and is more likely to result in capturing a plant most amenable to cultivation.

3) When collecting, proceed slowly and cautiously through the site to minimize your trampling and disturbance of plants or their habitat. Take care to correctly label all the seeds you collect, and do not confuse collections of separate species.

4) Do not collect seeds if you cannot distinguish between mature and immature seed. Maintain collected seed in appropriate containers and environmental conditions.

5) We encourage you to provide accurate location information for all seed bank donations of seed collections and subsequent offspring. The ICPS will only publish seed provenance information to county (or equivalent) resolution.

6) Follow all local, national, and international laws when collecting seed. Many areas have special protection status, and prohibit collecting seeds without collection permits. It is the collector's responsibility to be sure all laws are being observed.

7) The ICPS maintains an "Imperiled Carnivorous Plant Species List" of plants considered particularly at risk. The list is included below as an appendix; for an updated list refer to the ICPS web site. The ICPS seed bank will not accept field collect-

ed seed of listed plants. Seeds from cultivated plants on this list will be accepted by the seed bank if they are donated in accordance with all relevant laws.

8) Anonymous donations of species listed on the Imperiled Carnivorous Plant Species List will not be distributed by the ICPS seed bank.

APPENDIX: IMPERILED CARNIVOROUS PLANT SPECIES LIST

- Dionaea muscipula* Soland. ex Ellis: Note B
Drosera regia Stephens: Note B
Nepenthes aristolochioides Jebb & Cheek: Note A
Nepenthes bellii Kondo: Note A
Nepenthes boschiana Korth.: Note A
Nepenthes burbidgeae Hook.f. ex Burb.: Note A
Nepenthes campanulata Kurata: Note C
Nepenthes clipeata Danser: Note A
Nepenthes dubia Danser: Note A
Nepenthes gracillima Ridl.: Note A
Nepenthes lavicola Wistuba & Rischer: Note A
Nepenthes macrophylla (Marabini) Jebb & Cheek: Note A
Nepenthes masoalensis Schmid-Hollinger: Note A
Nepenthes murudensis Culham ex M. Jebb & M. Cheek: Note A
Nepenthes paniculata Danser: Note A
Nepenthes pilosa Danser: Note A
Nepenthes rajah Hook. f.: Note A
Nepenthes talangensis J. Nerz & A. Wistuba: Note A
Nepenthes truncata Macfarlane: Note A
Pinguicula ionantha Godfr.: Note B, D
Sarracenia alabamensis Case & Case (= *Sarracenia rubra* subsp. *alabamensis* (Case & Case) Schnell): Note B, D
Sarracenia jonesii Wherry (= *Sarracenia rubra* subsp. *jonesii* (Wherry) Wherry): Note B, D
Sarracenia oreophila (Kearney) Wherry: Note A, D
Sarracenia purpurea subsp. *purpurea* f. *heterophylla* (Eaton) Fern.: Note B
Sarracenia purpurea subsp. *venosa* var. *montana* Schnell & Determann: Note B
Sarracenia rubra subsp. *gulfensis* Schnell: Note B

Listing justifications:

- Note A: Listed on the IUCN Red List as “Critically Endangered” or “Endangered.”
Note B: Not listed on the IUCN Red List as “Critically Endangered” or “Endangered”, but included at the discretion of the ICPS Conservation Program.
Note C: Listed on the IUCN Red List as “Extinct,” this species has been rediscovered in the wild.
Note D: This taxon falls under protection by CITES (Appendix 1) and/or the USA Endangered Species Act.

PINGUICULA LOXENSIS (LENTIBULARIACEAE)—A LOST
NAME BY HUMBOLDT AND BONPLAND?

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Early botanical explorers journeyed to remote and physically challenging places in search of new scientific wonders. However, because of quirks in communication and publication, not all their new discoveries remained discovered! The following is a story of how a species of *Pinguicula* was found in the early 1800s, just to be lost in the seas of literature. It is only now, after nearly 200 years, that the discovery has been refound and rescued.

The expedition to South America and Central America in 1799-1804 by Friedrich Heinrich Alexander von Humboldt (1769-1859) and Aimé Jacques Alexandre Goujaud Bonpland (1773-1858) was the most important ever made to America. The long and arduous journey into regions then little known is “surely one of the most remarkable and fruitful in the whole history of scientific exploration” (Stearn, 1968). The travelers amassed an immense quantity of botanical, zoological, geological, geographical, historical and political specimens and observations, which formed their famous and well-illustrated *Voyage aux Régions équinoxiales du Nouveau Continent*. This account was published shortly after the completion of the expedition (1805-1835 [1837]).

From the standpoint of taxonomy, the botanical collection from this expedition—more than 6,000 specimens now mostly deposited in the Paris Muséum National d'Histoire Naturelle—is also the most important ever made for tropical America. Most of the 3,600 new American species that resulted from the expedition were published in the monumental seven-volume *Nova Genera et Species Plantarum* (1816-1826) by Karl Sigismund Kunth (1788-1850); the authors of these species are familiar to botanists by their initials “H.B.K.,” which stands for Humboldt, Bonpland and Kunth. For the details of the collections see Stearn (1968), and of the publications see Fiedler & Leitner (2000).

The contemporaries were especially amazed about the *Relation historique du Voyage aux régions équinoxiales du Nouveau Continent* (1814-1825), the “story” of the journey. Humboldt's vivid, imaginative and humorous style let the reader virtually join the travelers and participate in the adventurous and difficult journey. The story is incomplete—volume 4 was to contain the second part of the expedition through the Andean region, but it was never published. As such, the account ends with the arrival of the group in Barcelona (Venezuela).

The second part of the expedition led across Cuba to Cartagena (Colombia) and along the Andean mountain range southward via Quito (Ecuador) to Lima (Peru). On the way Humboldt and his companions passed many volcanoes, which they ascended. Humboldt's account in his journey diary culminates in the description of the ascent of the Andean volcano Chimborazo, in those days reputed to be the world's highest mountain. Its summit is about 6,310 meters, or 20,700 feet.

On 23 June 1802, Humboldt, Bonpland, and their companions ascended Mount Chimborazo slopes to an elevation that Humboldt recorded to be 5,881 m. However,

his monitoring equipment was apparently inaccurate, a more recent estimate their highest point on the slope of Mt. Chimborazo is about 5,350 m (Faak 1974: 39) or 5,500 m (McIntyre 2000: 228). The group did not reach the summit because of the hostile nature of the conditions on the mountainside (snowfields and extreme cold) and the insufficient general fitness and gear of most of the mountaineers. Humboldt wrote in his journey diaries (in extracts published by Faak 1990: 220; German ed., translated by me), that "...symptoms of asthenia were induced by the lack of oxygen...and the thinner air in the higher regions...We climbed for another half an hour. It became so misty that we could not see the summit." Afterwards, we read (Faak 1990: 220) that he found comfort: "...looking through the telescope we have seen that the summit consists of nothing else than snow". Therefore, they resolved to turn back and climb down to the foot of the volcano.

For its time, the ascent of Mt. Chimborazo was extraordinary—it was certainly one of the scientific and emotional highlights of the journey—and news of it echoed around the globe (cf. the report of Delambre to Napoléon Bonaparte in Paris; Bertuch, 1808). We feel a touch of irony when reading the Galletti-howler¹ nr. 439 (Minkowski, 1966: 86): "When Humboldt was climbing the Chimborazo the air was so thin that he could no longer read without his spectacles." ("Als Humboldt den Chimborasso bestieg, war die Luft so dünn, daß er nicht mehr ohne Brille lesen konnte.")

Following this famous, legendary adventure, Humboldt and his companions went southward along the mountain range from Riobamba by way of Tixán, Azuay, Cuenca, Cumbe, Nabón, Oña and Saraguro to Loxa [Loja]. "This mountain range of Saraguro...is among the most beautiful and richest in plants we have ever seen. We covered the whole distance by foot in two days, loaded with plants and wallowing in the mire to the knees. In the early morning of July 23 we arrived at Loxa...." (Faak, 1990: 237).

On this part of the trip, Humboldt and his friend Bonpland found a small violet flowered butterwort, which Bonpland described in detail as a "*pinguicula*" in the hand-written *journal botanique* on fol. 136 (ms. 53, no. 3319; now in the Paris National Museum d'Histoire Naturelle; see for the whole question of the *journal botanique* Lourteig, 1977). He did not supply a species epithet, but indicated the habitat "...In sylvis propé Saraguro". Later on, another person (Kunth?!) added, in the space left blank behind the name "*pinguicula*", the epithet *calyprata*.

In the botanical description of *Rhexia reticulata* (Melastomataceae) found "*in montibus Saraguru frigidis, prope Loxam*" (Bonpland, *Monographies des Mélastomes ... Voyage ... Part VI, Sect. 2, 1806: 22*) we read: "1. La Rhexie croît spontanément dans la montagne de Saraguru près la ville de Loxa....à 2,000 mètres d'élévation sur le niveau de la mer..." and "2. Avec plusieurs espèces de *Weinmannia*, la *Rhexia reticulée* fait le fonds de la végétation dans cette partie des Andes; on y trouve aussi quelques espèces arborescentes du genre *Aralia*...quelques jolies Gentianes, et le *Pinguicula Loxensis*¹". The footnote runs as follows: "Voyez cette dernière plante dans le grand tableau qui accompagne l'Essai sur la Géographie des Plantes, rédigé par M. de Humboldt." The author of this passage must be Bonpland because Humboldt (1814) wrote in his *Introduction* to the Relation historique: "Of the mentioned works, the second and the third (i.e. the *Plantes équinoxiales*...and *Monographies des Melastomes*...)

¹A howler is a glaringly obvious or ridiculous word blunder, often unintentionally humorous in effect. Johann Georg August Galletti, 1750–1828, teacher at the classical college Augustinum at Gotha, professor in history, historiographer and privy councillor of the principality Gotha, well known with Alexander von Humboldt, is the "father" of the German "Kathederblüten," an anthology of unintentionally queer howlers. Some of them were compiled by his pupils and were first published by August Parthey in Berlin, 1866. The howler regarding Humboldt is a typical example.

have been prepared by Bonpland on the basis of his on-the-spot observations laid down in his botanical diary. This diary contains the methodical descriptions of equinoctial plants; I myself have only written the ninth part of them.” (My translation follows the German edition of the *Reise in die Äquinoktial-Gegenden...* (Ette, 1999).)

In the “*Naturgemälde...* Humboldt (1807: 67) wrote of the “anmuthigen Tälern um Loxa..., dem Garten der Andesischen Gebirge” (“charming valleys around Loxa..., the garden of the Andean mountain range”). On page 71 we learn: “In an altitude of seventeen hundred metres...occur *Porlieria hygrometrica*, the weather forecasting shrub...*Citrosma* with its aromatic leaves and fruits; *Hypericum baccatum* and *cayenne*....In an altitude of two thousand and six hundred metres and especially in three thousand metres *Acaena*, *Dichondra*, *Nierembergia*, *Hydrocotyle*, *Nerteria* and *Alchemilla* form a thick lawn. This is the region of the *Weinmannia*, the oaks and the *Spermacocce* (sic!)...” And on page 74 we are informed that “...between 2800 and 3800 m...the region of *Wintera grenadensis* and *Escallonia* lies. These inhospitable regions (which the Spaniards name Paramos because of the everlasting slushy-moist cold) are covered with shrubby bushes...some *Rhexies* and *Melastomes* lose themselves in these wilderness...*Alstonia*...*Escallonia tubar*, and some *Andromeda* species shade low *Lobelies*, *Baselles* and...*Swertia quadricornis*...(p. 75). To the region of *Escallonia* adjoins directly the region of the *alpine herbs*...Here are gregariously growing *Gentianes*, *Staehelines*, and *Escallonia frailexon*...and other alpine herbs....”

Considering the Bonpland passages about *Weinmannia* or *Rhexia* we would have expected to detect the name *Pinguicula* or *Pinguicula loxensis* respectively; but Humboldt mentions only species of *Lobelia*, *Sida*, *Ranunculus*, *Ribes*, and *Gentiana* and refers us to descriptions of the other alpine herbs in the following copies.

Yet, we become satisfied: the grand copper plate (see Back Cover), a very impressive idealized profile through the Ecuadorean Andean mountain range with the Chimborazo dominating the scene, shows not only the altitudinal zonation of the vegetation but also the names of a great number of floristic elements. Humboldt described the copper plate in detail and recorded that his “*Naturgemälde*” should include all the physical phenomena, i.e. the botanical, zoological and meteorological ones between the 10° northern and 10° southern parallels². The names of the plants are printed in letters as tiny as they are far and between. If you scrutinize the often curved binomials, one after another, you will be lucky if you can detect the name *Pinguicula loxensis* on the mid-left of the picture, near *Gunnera*, *Cinchona*, *Viburnum*, *Quercus grenadensis* and others (see Figure 1). In his first sketch of the profile from 1803 I have detected the mere generic name *Pinguicula* without specific epithet in the altitudinal zone between 1,000 and 1,500 toises. Outside the profile on its right side “Hauteur de Loxa” is added; see also below.

In February 1803, at Guayaquil, Humboldt drafted his “*Naturgemälde*”. Stearn (1960) postulates Humboldt would have drafted his *Essai*... (see below) in 1802 “at the foot of Mount Chimborazo”. But this statement contradicts Humboldt’s own remarks in the German edition in which we read: “Ich habe die erste Skizze dieser Arbeit...im Hafen von Guayaquil entworfen im Februar 1803, als ich von Lima zurückkehrte.” (i.e. “I have drafted the first sketch of this work...in the harbour of Huayaquil [Guayaquil] in February 1803, when I returned from Lima.”) Proof of the correctness

²Humboldt drafted his *Essai*... and the huge chart 1803 in Guayaquil (Ecuador) and elaborated it in Paris with help of the apt draughtsman Lorenz Adolf Schönberger. He added the copperplate print (engraved by Louis Bouquet, coloured in some but not all copies) entitled *Tableau physique*... (in the French editions) or *Naturgemälde der Tropenländer* (in the German editions). The sections *Tableau physique*...or *Naturgemälde* respectively, he regarded as the summary of his and Bonpland’s observations in the Andean Region of South America!



Figure 1: A detail from the figure on the Back Cover, showing the words “*Pinguicula loxensis*” more clearly, here at the central, lower portion of the figure.

of Humboldt’s note is the existence of the coloured hand-written first sketch believed to be lost. It is entitled “Geographie des plantes pres de l’Equateur. Tableau physique des Andes et pais voisins, dresse sur les observations et mesures sur les lieux en 1799-1803”; see Beck & Hein 1989: 28ff.; pl.1. The difficulty of preparing and engraving the huge, detailed chart delayed publication at Paris until 1807; a preliminary lecture to the Institut de France was held and a corresponding edition dedicated to Antoine Laurent du Jussieu and René Desfontaines was delivered in January 1805, some of the copies dated 1805, others 1807 (Stearn 1960; cf. Fiedler & Leitner 2000).

Humboldt finished his famous work, *Essai sur la Géographie des Plantes, accompagné d’un tableau physique des régions équinoxiales...* one of the few classics in botanical literature, the landmark of plant geography as a scientific discipline, at Paris in 1807. He recorded the altitudinal zonation of the vegetation on the basis of his “Reisetagebücher” (“journey diaries”; now in Berlin, Berlin-Brandenburgische Akademie der Wissenschaften) and Bonpland’s and his *journal botanique* and barometric measurements. Today it decorates the cover of the *Catalogue of the vascular plants of Ecuador* (Jørgensen & León-Yáñez, 1999), and the cassette of the recent two-volumed German edition entitled *Alexander von Humboldt, Reise in die Äqinoktial-Gegenden des Neuen Kontinents* (Ette, 1999).

This story confirms the saying “We see what we know”, i.e. without having previously read Bonpland’s above mentioned note on *Weinmannia* and *Rhexia reticulata*, I would probably not have discovered the hidden but unequivocal hint on the copper-plate at the Humboldt-Bonpland *Pinguicula*. I could not find any other note about *Pinguicula loxensis* in the whole work of the *Voyage...*

The rare copper plate loosely adjoined to the *Essai...* and often enclosed in a separate case was, in the German edition, entitled “Geographie der Pflanzen in den Tropen-Ländern; ein Naturgemälde der Anden. Gegründet auf Beobachtungen und Messungen, welche vom 10ten Grade nördlicher bis zum 10ten Grade südlicher Breite angestellt worden sind, in den Jahren 1799 bis 1803. Von Alexander von Humboldt und A.G. Bonpland.” This edition was dedicated to Goethe (*An Goethe*) with a vignette painted by Thorwaldsen and engraved by Massard. It symbolizes the unification of poetry, philosophy and natural history: Apollo, personified by the statue of

Goethe, unveils the mystery of nature, the “Great Mother”, personified by the statue of the goddess Diana of Ephesus with her breasts of wisdom (also known as Artemis multimammia) (Beck & Hein, 1989; Nickel, 2000).

Why did Kunth (1817/1818) not adopt the *Loxa* name when dealing with *Pinguicula* for his “*Nova Genera et Species...*”? As Humboldt *expressis verbis* writes (“*Naturgemälde*”, p.56): “On the basis of the journals of our expeditions we are able to indicate for nearly every collected plant parallel site, maximum and minimum of altitude, temperature of the air, character of the ground etc.” But in the special case of *Pinguicula loxensis* his remark is not quite right: in the *journal botanique* we find an Andean *Pinguicula* but no species name from Bonpland’s or his hands (see above).

Kunth obviously passed over Bonpland’s and Humboldt’s printed name. Maybe, he did not have easy access to the relevant notes or observations of Humboldt and Bonpland, nor Bonpland’s *Monographies des Melastomes* (1806), nor Humboldt’s *Essai...* [although I cannot believe this]. He created the new name *Pinguicula calyptrata* for the already named *Loxa* [Loja]-plant. The type voucher at P shows only three handwritten elements: the name “*P. calyptrata*,” the number “3319” and the locality “Loxa.” (I do not want to discuss the possible synonymy with *P. involuta* Ruiz et Pav.)

Since then, the “original” name *P. loxensis* (today only a *nomen nudum*) has been totally lost in the floristic literature of Ecuador and Peru and in the systematics of *Pinguicula* overall.

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A NOVEL METHOD FOR THE CULTIVATION OF
NEPENTHES VILLOSA

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Keywords: cultivation: *Nepenthes villosa*.

Nepenthes villosa! Who among the ranks of nepenthophiles has not dreamed of successfully growing this species, the crown jewel of Mt. Kinabalu? Personally, I have coveted it since first seeing its image in the May 1964 issue of "National Geographic" magazine, many years ago. Of course, I also despaired of ever having an actual opportunity to grow it since the possibility of obtaining a specimen seemed remote indeed. However, with the advent of tissue culture techniques, it is now possible for almost anyone with the desire to grow this plant to do so. Or, at least, to try to do so!

Ah, yes, therein lies the rub, as Shakespeare would say. For, as many of us have discovered, *N. villosa* is truly a demanding plant to grow. Although more tolerant of warm temperatures as a seedling, its requirements are still rather stringent. In fact, for several reasons this is a species which I recommend only for the true die-hard *Nepenthes* aficionado. First, this is a plant which really does need cold nights (down to 2-4°C, 36-39°F) and cool days (13-16°C, 55-61°F) to truly thrive. It is therefore not a suitable candidate for even the standard highland *Nepenthes* environment. Yes, it can tolerate warmer conditions, at least for short periods of time, but growth will slow to a virtual standstill, and pitching will cease. In addition, such stress greatly increases the plant's susceptibility to disease. Secondly, this plant likes high levels of illumination. By this, I mean that while it likes as much light as other *Nepenthes* which grow in similarly open areas, the trick is in ensuring that meeting the species' need for good illumination does not result in overheating. Finally, this is at best a slow-growing plant. Thus, while one need not worry about it outgrowing its confines in short order (oh, to have such a problem!), it is important to consider whether one has the long-term interest and stability to provide the plant with the conditions it requires for the many years it will take to for it to grow to a respectable size. It is not, for example, the kind of species which should be cultivated by youngsters who are likely to lack the requisite focus and commitment required for its continued well being, or who may leave the plant in the hands of parents as they go off to college. Therefore, beautiful and desirable though it is, it is my opinion that its cultivation is best left to those whose love of, and devotion to, the genus borders on the fanatical. However, having said all that, I do believe that it is possible to grow this species, and to do so acceptably well.

Seven years ago, I received my first specimen of *N. villosa*, a seedling about 1 cm (0.4 in) in diameter. I was concerned about its overnight temperature requirements, but soon found that the plant was fine as long as temperatures dropped into the nocturnal range typical for highland *Nepenthes*, (50°F, or 10°C). However, after the plant reached a size of about 4 cm (1.6 in), its growth slowed, and pitching became infrequent. Fearing that I would lose it, and correctly surmising that its difficulty was due to its need for cooler conditions, I promptly moved it from its bench top location to a position on the floor of my highland *Nepenthes* environment. Shortly thereafter, normal growth resumed and it increased in size considerably. However, as time passed, the growth of my *Nepenthes* collection forced me to implement changes which reduced the intensity of the illumination available for plants

on the floor of my growing area. The illumination then reaching my *N. villosa* was no longer sufficient for its continued growth. It stopped pitching and ceased to be its vibrant and healthy self.

Being an attentive plant slave, I noticed the change in my specimen rather quickly and began to consider the options available to allow continued cultivation of this species. The key issue, as mentioned before, is simply keeping the plant cool enough. Therefore, I initially considered building a custom refrigerated terrarium, but after further thought I “cooled” to the idea due to the obvious expense, time, and effort involved. It seemed to me that with the panoply of refrigeration technology so readily available it should be possible to apply some extant device to the problem rather easily. And, in fact, the solution I have implemented is quite obvious and simple, although still a bit expensive.

Specifically, my approach has been to employ a chest freezer of moderate size as a large terrarium. The advantages are clear: such a device is readily available, and is well suited to cool its enclosure dramatically, if need be. Furthermore, it is well insulated, and can therefore allow one to maintain very cool growing conditions, even in a warm area. Finally, the modifications required to use such a device in this unorthodox way are very slight!

Therefore, now having a reasonable plan of action, I immediately obtained a 0.15 cubic meter (5.2 cubic foot) Frigidaire chest freezer from my local retailer. The cost of this bit of refrigeration technology is about US\$150 at present; not cheap, to be sure, but not incredibly exorbitant. A used freezer may be found for much less money, but make sure that such a device is functioning prior to purchase. In addition, be sure that the inside surface of the freezer is intact and waterproof. This is very important since one will not be using the freezer in the normal way, and water will quickly build up inside. Failure to observe this precaution will likely ensure immediate disaster!

The only modification I made to the freezer was to remove its lid. This was attached with a few bolts, which were easily unscrewed. I replaced this lid with one made of clear Plexiglas, about 5 mm thick. This choice was predicated upon the facts that Plexiglas is cheap, does not pose the same safety hazard as glass, transmits visible light well, and is a reasonably good thermal insulator. To minimize transmission of heat by convection, I applied weather stripping to the edges of the Plexiglas cover. When it was finished, it was ready to be placed on top of the freezer.

The major remaining issue was to accurately regulate the temperature inside the freezer. This is accomplished by means of a simple 120 V thermostat, commonly available in garden supply stores. This type of thermostat may be configured to supply power to the freezer as long as the temperature inside is above the desired set point. In my case, this is about 3°C (37°F), which is appropriate for the nocturnal temperature range *N. villosa* requires. Once the desired minimum is set, simply plug the freezer into the thermostat and place the thermostat in the growing area inside the freezer, making sure that it does not get wet!

Of course, there are a few other details to address before actually placing plants in the modified freezer. The most pressing of these is simply having a platform on which to rest the plants. This problem may be easily solved by construction of a small support frame tailored to the dimensions of the freezer. I constructed mine from small diameter PVC piping. I chose this material because it is cheap, easy to cut, and will not rot. The amount of time required for construction is minimal; the entire process took under an hour. Once the frame was in place, I placed a platform upon it. A good choice for this is the common “egg crate” type of light diffuser, which is commonly found at home supply stores. This material is light, impervious to water, and is easily cut to fit the desired space.



Figure 1: The ultra-highland environmental chamber with the transparent cover and overhanging lights removed to show the placement of the plants.

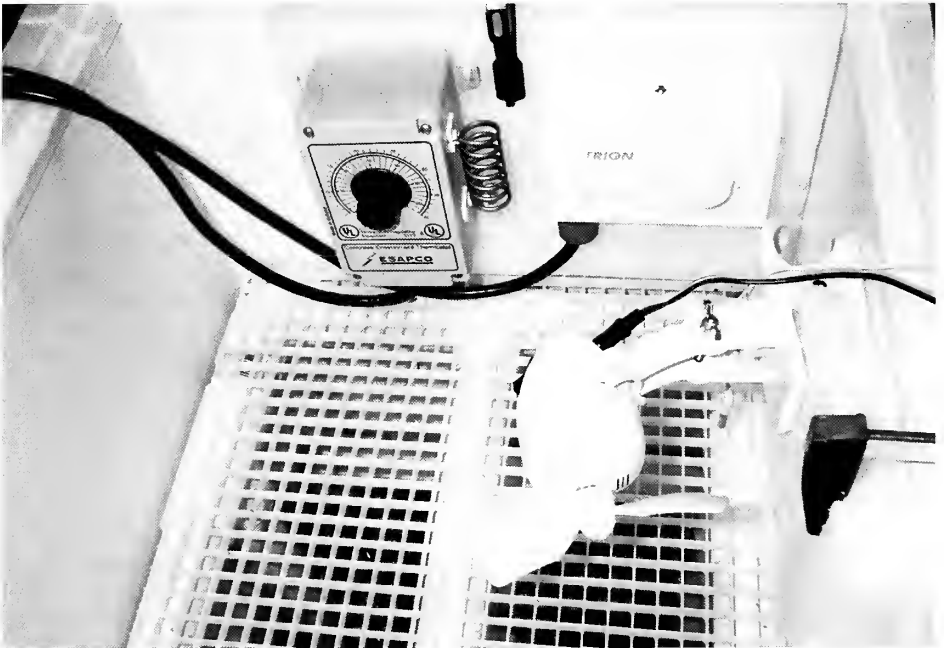


Figure 2: The control panel of the growing chamber.

The choice of illumination is up to the reader, but I do not recommend sunlight or any other source of light which will cause excessive heating. I employ two simple fluorescent fixtures, each containing two 40W, standard, cool white bulbs. These fixtures are located about 10 cm (4 in) above the transparent lid of the enclosure, and are regulated by a timer to ensure a 14-hour photoperiod. This has proven to be more than adequate for the cultivation of *N. villosa*. In fact, some leaf burning has been observed, and I have somewhat reduced the intensity of the illumination because of this.

When running one's ultra-highland environmental chamber (as I like to refer to my modified freezer), it is important to bear a few points in mind. First, one must either turn the freezer off during the day to allow temperatures within to rise to acceptable daytime highs, or readjust the thermostat set point to a higher value, appropriate for daytime growing conditions. I have found that during the warmer months, the latter course of action is required, but during the winter it is sufficient for the freezer to simply turn off; during the cooler months, temperatures inside have never risen above 15°C (59°F). Second, a considerable amount of water will build up within the freezer from watering the plants. To date, this has not proven to be a problem, but it is probably ill-advised to allow excessive amounts of water to collect there. However, the presence of some water is clearly needed to maintain appropriate humidity inside the enclosure. Moreover, the presence of such water serves as an excellent source of thermal inertia. This is important since most freezers are efficient enough to lower temperatures inside themselves by several degrees per minute! Since living things are not accustomed to such rapid climatic variations, it is unquestionably beneficial to moderate these fluctuations, and I have observed that some amount of water inside the freezer serves this function well. The additional obvious benefit is that this same thermal inertia can help ensure that daytime temperatures do not rise too rapidly, or possibly to too high a value.

One may also wish to consider installing a small fan inside one's freezer. I have done this to facilitate air circulation and to simulate the winds which Charles Clarke has informed me are very common on Mt. Kinabalu. My fan does not run continuously, but is regulated by a small humidistat which turns it on when humidity drops below 75%. This is especially useful when the freezer begins cooling the environment at nightfall, since the cooling process causes rapid condensation of moisture from the internal atmosphere.

Finally, in the interest of monitoring conditions inside, I recommend the purchase of an indoor/outdoor thermometer. Place the outdoor sensor inside the freezer, which allows for easy monitoring of temperature inside. This way, one can check the accuracy of one's thermostat and adjust accordingly.

As of this writing, nearly a year has transpired since I first completed the process described herein. During that time, I have observed the growth of several specimens of *N. villosa* in my chamber. All of them have grown and pitched successfully, and based on my observations to date, I believe it possible to reliably grow this species to large size in such an environment. In addition, other difficult species, such as *N. lamii* have also grown very well under these conditions. It is, therefore, the hope of the author that this approach is useful to other growers and aids them as they cultivate the coveted jewel of Mt. Kinabalu.

NEW CULTIVARS

Keywords: cultivar: *Sarracenia* 'Chas' Brew', *Sarracenia* 'Cobra Nest', *Sarracenia* 'Scarlet Belle'.

Sarracenia 'Chas' Brew'

Submitted: 20 July 2002

Sarracenia 'Chas' Brew' is a *Sarracenia oreophila* × *Sarracenia rubra* subsp. *wherryi* cross that is a vigorous grower, and which rapidly produces new pitchers and crowns throughout the growing season (see Front Cover). Pitchers are 15-20 cm (6-8 inches) at maturity with physical features typical of both parents. Lid morphology is convex and triangular when viewed from above. Further, the width, length, and height of its lid is uniquely large 5 cm (2 inches) relative to the 2.5 cm (1 inch) diameter pitcher opening. Also noteworthy, the lid tilts slightly upward from the horizontal and the pitcher opening tilts slightly downward from the horizontal. This feature gives *Sarracenia* 'Chas' Brew' significant exposure to the inside of the pitcher. The entire pitcher has a pale yellow/green background with an orange lid in full sunlight. There is bold venation throughout the pitcher and lid, both internally and externally, similar to many clones of *Sarracenia oreophila*. Flowers have pale yellow petals without noticeable fragrance. Vegetative propagation is necessary to maintain the unique features of this hybrid.

The cross resulting in this plant was performed by Charles Brewer. The cultivar name ('Chas' Brew') is a pun on Charles' name.

—CHARLES BREWER • VA, USA • STEFAN PLOSZAK • NC, USA,

Sarracenia 'Cobra Nest'

Submitted: 3 September 2002

Booman Floral announced the introduction of the world's first patented carnivorous *Sarracenia* hybrid, named *Sarracenia* 'Cobra Nest' (see Figure 1, page 26). The United States Patent office granted propagation protection to this new cultivar on August 6, 2002. *Sarracenia* 'Cobra Nest' is the first plant that was bred and selected to be easy to grow for consumers, and suitable for pot plant production by commercial growers. The fanciful name refers to the thick cluster of snake leaf traps.

This cultivar earned its patented status for its unique horticultural characteristics. It grows vigorously, year around, in a compact shape, about 25 cm (10 inches) tall. This is in contrast to many wild species, which turn brown in the Fall and go dormant. A flaring hood reflexes over the top of the hollow tube leaf. While ornamental, it is also a practical feature as it prevents leaf collapse when water or rain hits the plant from above.

Sarracenia 'Cobra Nest' is slightly more resistant to leaf edge browning from salt or fertilizer burn when compared to many wild species. Leaf traps open green, then turn red and maroon as they mature. The plant branches very freely, which gives it a full thick appearance, much appreciated by customers. Flowers are large with pink pendant petals, and white sepals, appearing after one year, in the summer.

Sarracenia 'Cobra Nest' is a hybrid that resulted from a six year collaborative breeding and selection program between me (Booman Floral), and Dr. Larry Mellichamp (University of North Carolina at Charlotte). Hundreds of thousands of seedlings were grown and evaluated during the selection process. The exact parentage of *Sarracenia* 'Cobra Nest' is unknown.

Developing commercially viable cultivars helps preserve the plants in the wild. Housing developments, pine plantations, and farming have encroached upon or destroyed most *Sarracenia* habitats. Poachers have wiped out many *Sarracenia* as well. By creating new cultivars that actually grow better for consumers and by growing them in nurseries, we hope to protect the remaining wild populations.

Booman Floral will have limited supplies of *Sarracenia* 'Cobra Nest' available through the retail web company www.plantsforkids.com beginning Summer 2003. Wholesale growers may order plugs for shipment in Fall of 2003.

—JAMES L. BOOMAN • Booman Floral • 2302 Bautista Avenue • Vista, CA 92084 • USA

Sarracenia 'Scarlet Belle'

Submitted: 15 November 2002

Sarracenia cultivars can be found naturally, but the best are planned and then created by combining the best traits of two plants. Rather than just pairing two random plants and hoping for the best (which is usually a waste of time, energy, and resources), hybridizers plan and design characteristics into the final product. Such engineering resulted in *Sarracenia* 'Scarlet Belle.'

I was growing and selling plants for the retail and wholesale carnivorous plant trade via WIP (World Insectivorous Plants, circa 1976-1990) when I developed the hybrid cultivar that is finally being named *Sarracenia* 'Scarlet Belle'. It was one of two plants that I wanted to produce for collectors and the wholesale market. I sought to offer a *Sarracenia* that would exhibit the best of the genus by having a striking combination of vivid colors, as well as being a plant that would grow rapidly, perform well in shade or bright sun, tolerate soil moisture levels ranging from very wet to almost dry, maintain a compact form for easier and less destructive transport, and have an abundance of firm, long lasting, and intriguingly shaped pitchers. I was able to develop this showstopper by combining *S. leucophylla* and *S. psittacina* parents that fully met my design criteria. Only the single best plant from the progeny was selected for tissue culture replication.

Sarracenia leucophylla is noted as one of the best species of the genus for coloration and form. It has two pitching seasons, and grows well in wet or semi-dry open savannas. Unfortunately for my target goal, it is a rather tall species, and mature plants only produce a few pitchers at a time. Its counterpart for this pairing, *Sarracenia psittacina*, is a colorful low-growing rosette that prefers wet to soggy habitats. While *S. psittacina* plants can be found naturally in open locations, they seem to be more at home and are typically found in shady areas under shrubs or between tall grasses. One very desirable feature of this species is its propensity to produce an abundant quantity of pitchers that retain their color during the normal winter dormancy period.

Sarracenia × *wrigleyana* is an uncommon, but naturally occurring hybrid (*S. psittacina* × *leucophylla*) periodically found in Gulf Coast savanna bogs containing both parent species. I believe that the majority of *Sarracenia* × *wrigleyana* plants result from crosses where the maternal parent is *S. psittacina*. This is because *Sarracenia* are protogynous, meaning the stigmas are mature and able to receive pollen before the stamens release pollen. Because of this, a *Sarracenia* flower is most likely to be pollinated by other flowers that matured earlier in the season. This aspect also serves to minimize self-pollination. Since *S. leucophylla* plants typically flower four to six weeks earlier than *S. psittacina*, natural crosses between these two plants are more likely to involve a slightly late-blooming *S. leucophylla* (pollen parent) and a slightly early-blooming *S. psittacina* seed parent. As further evidence for my theory, most of the wild *S.* × *wrigleyana* plants I have observed were near a group



Figure 1: *Sarracenia* 'Cobra Nest'. Photograph James L. Booman.



Figure 2: *Sarracenia* 'Scarlet Belle'. Photograph by Michael Hunt.

of *S. psittacina* plants. I believe this indicates the seeds germinated directly from or near the seed parent, i.e. *S. psittacina*.

I wondered what the characteristics of *S. × wrightleyana* would look like if the parentage was reversed, i.e. if a *S. leucophylla* was the seed parent. From a production standpoint, *S. leucophylla* is a superior seed parent as it produces considerably more seed in the capsule than its counterpart. This aspect was important before the establishment of tissue culture reproduction for *Sarracenia*. Seed was the only viable means at that time to generate wholesale quantities of plants.

In the spring of 1985, I removed pollen from a very compact and maroon colored *S. psittacina* and used it to pollinate a number of crimson red *S. leucophylla* plants. Seed was harvested, cleaned, refrigerated, and stratified for sowing the following year. Plants were raised and then sold locally or exported to CRESCO, a major European carnivorous plant distributor at that time. I eventually stopped selling plants on a retail and wholesale level, but retained a few dozen of the most outstanding plants for my personal collection. It seemed that everyone who saw this particular hybrid wanted one. In retrospect, I should have attempted propagation by using the proven leaf extraction method that was used on rare forms of *S. psittacina*. I would simply pull off a full leaf or pitcher with some of the rhizome tissue, insert the bottom 3 cm into semi-moist chunky grade vermiculite, and enclose it in a humid terrarium. Roots would begin to form within four to six weeks. This vegetative propagation method might work on *S. × wrightleyana* because of its *S. psittacina* parentage.

A few years ago, I provided my best *S. × wrightleyana* plant to AgriStarts for consideration as an addition to their expanding carnivorous plant line. Mike Rinck was impressed with the sample and its pitcher retention during the winter months. He put the hybrid into AgriStarts' intensified tissue culture production program and it is now being sold in wholesale lot quantities.

Our son, Brian Hanrahan and his fiancée, Jennifer Kruse, selected the name 'Scarlet Belle' on August 7, 2002. I bestowed this honor on them as an endearing reminder of their wedding the following week. Jennifer is a "Belle" from Texas who incidentally selected a scarlet red color scheme for her wedding. These two facts, coupled with the plants natural coloration and "horn" or "bell" shaped pitchers, solidified the name selection.

Sarracenia 'Scarlet Belle' (see Figure 2, page 26) grows well in wet to semi-moist standard *Sarracenia* mixes. Coloration is best under full sun, but the plant tolerates and develops nice colors with lower light levels. It maintains pitchers throughout the year with some degradation in the winter months; growth spurts occur in the spring and late summer. It differs from typical *S. × wrightleyana* with its intense scarlet red pitchers and vigorous habit that produces a profusion of pitchers. The pitchers are up to 40 cm long, slightly conically tapered, with the mouth turned toward the center of the plant; the mouth opening is variable in aperture, from being totally closed to 5 cm wide × 3 cm high on mature pitchers and flared triangular in shape; prominent areoles descend decreasingly from the pitcher's mouth. All parts of the flower perianth are deep burgundy red; the size is intermediate between *S. leucophylla* and *S. psittacina*

Older pitchers can be removed to stimulate new growth and to maintain the plant's esthetic balance. Reproduction should be done only vegetatively, i.e., by tissue culture, rhizome division, and leaf cuttings (if it works!).

—BOB HANRAHAN • Carnivorous Plantation • 2336 Cross Creek Drive • Powder Springs, GA 30127 • USA • k4zd@arrl.net

ICPS ON THE WORLD WIDE WEB:
CARNIVOROUS PLANT NEWSLETTER INDEX

JOHN BRITTNACHER • P.O. Box 72222 • Davis, CA 95617-6222 • USA • john@car-nivorousplants.org

Keywords: computers: internet

You have how many centimeters of CPN issues on your bookshelves, and how often do you use them? My set is 16 cm wide or about 3100 pages. If you are lucky enough to have a complete set we are talking almost 4000 pages of articles and photographs related to carnivorous plants! This is a great deal of material, and sometimes it can be hard to search them for information about a particular species or topic. Thanks to members Tim Topoleski, Barry Rice, Mike Wilder, and myself there is a searchable index of all volumes of CPN on the ICPS web site.

The database contains entries for over 750 articles. You can search authors, title, keywords, and species. As an example, a quick species search on the keywords "drosera regia", finds seventeen articles that mention *Drosera regia*. Two articles you would find are:

Ziemer, Robert R. (1980) *Drosera regia* CPN 9(1):15.

Keywords: cultivation: *Drosera regia*

Species: *Drosera regia*

Notes: 2 color photographs

Robert Gibson (1999) *Drosera arcturi* in Tasmania and a comparison with *Drosera regia* CPN 28(3):76-80.

Keywords: observations: *Drosera arcturi*, *Drosera regia*

Species: *Drosera arcturi*, *regia*, *burmannii*, *binata*, *stenopetala*, *uniflora*; *Dionaea*; *Utricularia monanthos*

Notes: 6 references, 2 color photos (1 on back cover), 1 b&w photo, 1 table

A keyword search of "cultivation drosera regia" yields three articles explicitly about *Drosera regia* cultivation. There are thirty-one articles on *Drosera* cultivation that may contain information on *Drosera regia*. Search using the keywords "cultivation drosera" to find these articles. To find articles on the evolution of *Drosera regia* you would need to search for all articles on the species and look at the keyword field, or search for all articles with the keyword of "evolution" and look at the species list of the twenty articles found, or manually scan the four articles that would be found with a keyword search of "drosera evolution".

I use the CPN Index quite often when researching content for the web site and in learning about and growing my plants. The index will also help you find the articles you may have ignored when they first came out. The only way you can access the index is on the ICPS web site. If anyone wants to create a Microsoft Access or a FileMaker database application that could be downloaded or distributed by CD, please contact me by e-mail.

THE ICPS SEED BANK CAN NOW DISTRIBUTE ENDANGERED SPECIES SEED WITHIN THE USA!

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Keywords: conservation: seed bank.

The ICPS is pleased to announce that it has obtained a permit from the United States Fish and Wildlife Service (US F&WS) to distribute seed of threatened or endangered (T&E) carnivorous plant seed within the USA. This permit allows the ICPS seed bank to distribute seed of *Sarracenia alabamensis* (= *Sarracenia rubra* subsp. *alabamensis*), *Sarracenia jonesii* (= *Sarracenia rubra* subsp. *jonesii*), *Sarracenia oreophila*, and *Pinguicula ionantha*. Restrictions and policy on ICPS seed bank trade of T&E species are described below.

- 1) The US F&WS permits only allow trade within the USA. We do not have CITES permits to ship seeds of these plants internationally.
- 2) Donations of T&E species seed must only be from cultivated plants. Potential donors that have ownership or direct stewardship of wild, native populations of T&E plants are encouraged to contact the ICPS Director of Conservation Programs for alternative donation possibilities.
- 3) Anonymous donations of T&E species will not be accepted. Such seed will be destroyed.
- 4) International donations to the seed bank are permitted only if the donors have appropriate CITES permits. Seed sent internationally to the seed bank without CITES documentation may be in violation of CITES—such seed will be destroyed.
- 5) All seed bank donations must be accurately labeled. Location information for all seed will be printed in ICPS publications only to county level.
- 6) Unfortunately, donors of T&E seed cannot be awarded seed bank credit. The Endangered Species Act prohibits barter unless the donor also has US F&WS permits.
- 7) Hybrids involving T&E species (e.g. *Sarracenia jonesii* × *alabamensis*) are exempt from Endangered Species Act restrictions.

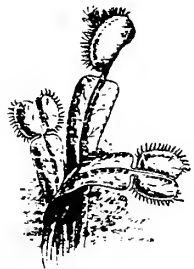
It is our hope that an active seed bank, that can provide seed of T&E species to as many people as possible, will help decrease poaching pressures on wild populations of these plants. Please donate your seed of T&E species to the ICPS seed bank!

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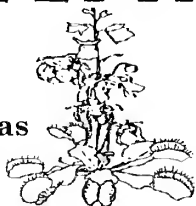
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