

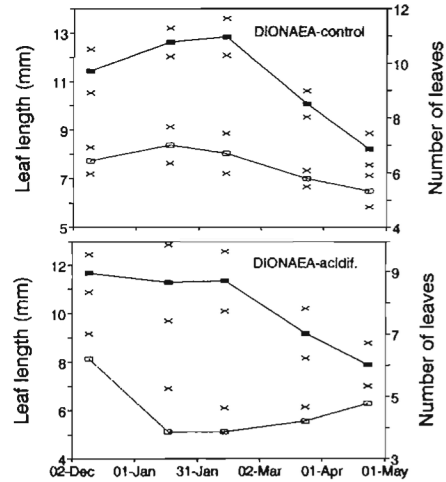


Figure 1. Longest leaf length and number of living leaves in *Dionaea muscipula* in the control and acidified fen soils over 134 days. Left axis, full symbols; right axis, empty symbols. Mean of 9 plants $\pm$ 2.SEM.

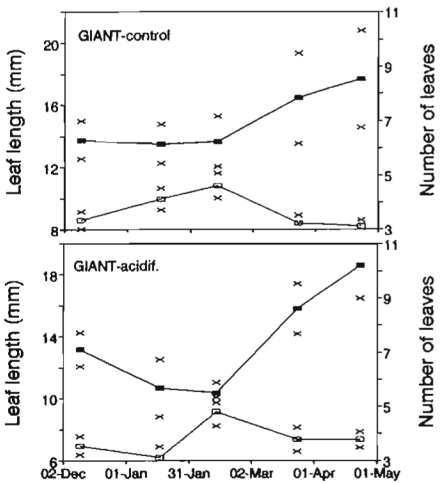


Figure 3. Growth patterns of *D. capensis* cv. Giant during the experiment. For explanation see Fig. 1.

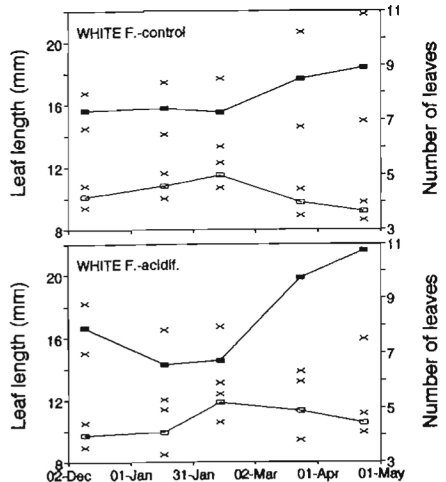


Figure 2. Growth patterns of *D. capensis* cv. White Flower during the experiment. For explanation see Fig. 1.

Thoughts, Reflections, and Upper *Nepenthes ampullaria* Pitcher

by
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In 1994, I decided to move my family over to Singapore and have finally decided to share some of my thoughts. I will stick to the topic, namely that of our beloved CPs.

Approximately four years ago, a group of us CP'erphiles decided to publish a biannual CP club newsletter serving the Pacific Northwest. I was the editor, Tom Kahl, the Northwest US representative, Randy Lamb the Yukon representative, Kevin Snively the treasurer, Bob Cattermole the events co-ordinator, Don Graham, secretary, Doug Fung, Education liaison, and Lorne Dennison, B.C. representative. Ambitious as it was, we had a lot of fun and camaraderie over our common interest. We had a lot of fascinating material in our newsletter, written by many people and we managed to further the knowledge of CPs through the local media and by locating new members. It is with sincere regret that a lot of correspon-

dence, ideas and articles have not gone further than the third issue of the PNWCP newsletter, and to this day remains unpublished. Unfortunately, something happened during the autumn of 1993.

In August of 1993, the PNWCP club had a meeting at my house in Vancouver, B.C., of which approximately 20 diehards participated...from Oregon, Washington, British Columbia, and Yukon. During this meeting, we formed the basis of a local plant exchange of which a purpose was to enlighten the general public, and to spread rare specimens into competent collections for the cause of conservation. We had wanted to do a planting in the Bloedel Conservatory in Vancouver. We even made arrangements with the various authorities and the like. Many plants came from private collections



Figure 1. Photo of Dr. C. L. Wong with upper pitcher on a *N. ampullaria* vine.



Figure 2. Closeup of upper pitcher of *N. ampullaria*.

and institutions. There were many beautiful donations, including specimens such as *N. stenophylla*, *N. macfarlanii*, *N. sanguinea*, *Heliamphora*, *Sarracenia* species and *Cephalotus*. I remember everyone being very proud of all the generosity coupled with the interesting discussions.

Later in the week I received a telephone call from a young, polite, but impatient collector. This individual, in his early twenties, had casually contacted a number of us over the past year and had al-

ways appeared rather anxious wanting to acquire everything, especially if it were "rare". He made contact with some of us a week after our August meeting. He was engrossed by the number of rare *Nepenthes* at that meeting and wanted to see them.

To make a long story short, in early September of 1993, Lorne Dennison had his greenhouse broken into. All of his rare *Nepenthes* were taken. Including a robust, but beautiful *N. burbridgeae*, the only one of its kind in the Northwest, and possibly the only one in Canada. I have known Lorne for a long time. As young enthusiasts, Lorne and I contacted each other through the ICPS and had thought we were the only two locals who enjoyed this neat hobby. Lorne had acquired most of his specimens long before all the CITES entanglement and difficulties. He had his *N. burbridgeae* "baby" for over 15 years.

Also removed from Lorne's collection were all his highland *Nepenthes* and rare orchids. I know Lorne as a very generous and friendly individual. The thief really crushed

Lorne. The saddest thing was that many of his plants were being prepared for divisions in the following spring, some earmarked for the public conservatory in Vancouver. Many people had been patiently waiting for their cuttings / divisions of one of Lorne's plants.

The Royal Canadian Mounted Police did an investigation and collected some evidence from Lorne's greenhouse.

A few weeks later, the same thing happened to me. The thief broke into my greenhouse, and stole all of my highland *Nepenthes* plants, numerous lowland species, and some of my best specimens of, *Darlingtonia*, *Heliamphora* and *Sarracenia*. This time he was seen. It occurred at 3:10 am, and was seen by my neighbours. He worked with an accomplice. Together the two came in through my rear yard, and filled up a black garbage bag with my plants. The thief then ran across my rear deck to the front yard. Unknown to the thief, all of this was caught by another neighbour's security camera. Recognizing him, we've given his name and copies of the videotape to the police. Fortunately for the young (early twenties) 5'9" + tall, long dirty blonde hair thief, I have not yet laid charges.

I was later informed that the fingerprints on my side yard gate matched the ones found on several other greenhouse break-ins. The perpetrator, who is a recent member of the ICPS, is reading this now. I hope he realizes what he has done. Because of his greed, many of us have made ridiculous security measures and trust no one. "Open houses" were put on hold, new faces were and perhaps are still greeted with caution, and the worst thing was that the "official" PNWCP club newsletter is no longer published as I was too upset to continue on. The thief had learned from earlier newsletters the telephone numbers and addresses of individuals and targeted specific collections described in the newsletters.

I apologize to all those who had wanted more information and a subscription to the PNWCP newsletter. I have been extremely bitter and perhaps my reflections here still indicate it. However, now that I have moved to Singapore, I can finally pen my thoughts down and have finally gotten this matter off my chest.

Being of several generations North American, I am really uncomfortable with the weather in Singapore. I think I am gradually adjusting to it though! It is really hot and humid. But these are the conditions the lowland *Nepenthes* thrive under. So it is with delight that I would like to report my observations to all of you. Hopefully, it will bring some new insights and give *Nepenthes* growers a better understanding and give their adopted plants a better fighting chance for survival.

I have briefly chatted with some of you on the "CP-Net", so some of you may already know that I have been regularly trekking through the jungles of Indonesia and Malaysia. I've bumped into some real nice people down here; in particular, Dr. Wee Kiat Tan, Dr. Hugh T. W. Tan and Dr. Chong Lum Wong (no relation), all of whom are professors at the various universities here. The best thing is that they also love *Nepenthes*! We explore various nature reserves and mountains on a regular basis, sometimes with students and other nature lovers.

Over the past number of months, with my wife's permission (of course!), I disappear into the jungles and look for variations of *rafflesia*, *amphylaria*, *albomarginata*, *sanguinea* and others. What is really interesting is the diversity of plants and animals here in Malaysia! Someone told me that one square mile of jungle here contains more different species than of the whole of North America.

I do not know if this is true, but seeing all the weird and wonderful plants, birds, fish, reptiles and bugs (excluding leeches) really delight you! As much as I would love to share my experiences with all of you, I will start with them one at a time and continually share my observations in future CPNs. I'll also jump onto the "CPNet", and do some daily entries into it during my treks.

After being informed that upper pitchers on *Nepenthes ampullaria* have never been observed before (i.e. recorded), Dr. C. L. Wong made an effort to find one. After observing thousands (tens of thousands?) of *N. ampullaria* plants, Dr. Wong finally

located a single upper ampullaria pitcher on a solitary plant in Singapore. This poor specimen was only about one foot tall and had been regularly cut over and over again by the maintenance people who looked after the area which was under some overhead power lines. A cutting was made of this plant and is now under care in the university greenhouse. Periodically, new upper pitchers have appeared on this specimen and the plant has been in cultivation for close to a year.

Pitcher plants are quite plentiful in this region (Malaysia, Singapore, Indonesia) but one has to know where to look. Once you locate them, they are so plentiful one tries with great effort not to step all over them. Not only are the pitchers beautifully painted individually with their own charming personalities, the leaves, seed pods and backdrop of adjacent vegetation really makes one just utterly charmed by this genus.

N. ampullaria grow to tremendous heights, it is not uncommon to see vines climbing up to more than a couple hundred feet tall, and if it were a male it would be an old clone with hundreds of vines climbing up. Females would also climb these heights, but have many generations of offsprings at their feet. Given a choice, *N. ampullaria*, along with other species would prefer the sunny side of an embankment. So walking along transversally on a sloped trail, more plants at least ten times more plants, are found on the high side of the trail, namely that side that has more sunlight. Plants are also readily located on disturbed soil. Ferns and *Nepenthes* are one of the quickest colonizing plants. But all plants grow fast in the tropics. So a disturbed site is usually less than half a year old. And perhaps due to the lack of other competitors, one tends to find more young plantlets (6 inch to 12 inch tall plants), and therefore more variations, than on more established sites.

The local substratum is a mix of rough sharp yellowish white coloured sand with lots of organic debris (leaves, twigs, dead insects) mixed into it. I would say this rough sharp sand comprises nearly 75% of the medium. The pH is just slightly off of neutral towards the acidic side. However, for all intents, the pH is neutral. Compare this with live sphagnum moss which is a little more acidic. Water drains through this medium, but not as quickly as one would expect. The rains here are fast and hard. It feels like someone turned on the taps full over your head for a few minutes, and even sometimes hours at a time. However, it inevitably stops and you are shortly greeted with the unforgiving tropical sun and hot humid air. I have also seen numerous *N. ampullaria* plants growing in and under streams and ponds.

The pitched specimens are found in both bright and shaded locales. I believe the plant prefers sunnier locations, as there are always many more young plants in sunnier sites. At the same time, plants found in shaded locations are off of branch-like terrestrial creepers. If you trace the plant, you would invariably locate nearby, long robust vines of the same plant climbing up trees to the sunlight. These upper vines may supply photosynthetic foods to its basal offshoot. Frequently, the aerial vines would have clusters of rosetted pitchers climbing up each of the many vines. But the largest and most spectacular pitchers are those located at the plant's base, usually hidden beneath forest debris and filled with many hefty meals of ants. Keep this in mind when growing *N. ampullaria* in temperate climates. I had always grown my ampullaria in the shade in a sphagnum/Styrofoam mix while I was in Vancouver. Although the plant grew, it was slothfully slow, giving me only a few leaves at a time. So give your young plants lots of light (but be careful not to burn them).

In any population of *N. ampullaria* plants, upper pitchers are extremely rare. Chances are that they are probably there but you would have to have a sharp eye and have the patience of "Job". Dr. Wong has located all the plants with upper pitchers. The number of separate specimens Dr. Wong has located to date is four. Considering the number of plants observed (many thousands), plants with upper pitchers are definitely uncommon. Plants that have upper pitchers are unique, such that neighbouring plants in the same soil conditions do not have the upper pitchers. I postulate the upper pitcher phenomenon to be a genetic factor, triggered by stress factors - namely, bright sunshine and / or repeated pruning (e.g. the lone plant found in Singapore exposed to

lawnmowers). To support this observation, I remember one site near Mersing, Malaysia. Great excitement was generated when Dr. Wong found a sparse colony of *N. ampullaria* with upper pitchers on them. But upon closer observation, we traced all the stems back to one single plant that had crept and crawled amongst its not so well endowed siblings. The plants are usually only of average height - four to seven feet tall, and are located on exposed sites.

Another factor that contributes to the difficulty of seeing plants with upper pitchers is due to the fact that the pitchers are so tiny! The largest upper pitcher we've seen to date is only 3/4 of an inch tall, the majority being a little better than half an inch in size. Whereas basal lower pitchers on the same plant may have pitchers reaching three inches. Emptying out the contents of the upper pitcher, we have found nothing - no fluids, no trapped animals. Perhaps the natural fluids and water from the rain evaporate too quickly for any results. As a conclusion, I believe the upper pitchers are just genetic throwbacks of this particular species, serving no real effective purpose.

While in Canada, my greatest joy with *Nepenthes* was to see them grow and flourish in my and other friends' greenhouses. Now my greatest joy is to walk the forests and see them growing naturally in their native habitats. Everytime I see the plants, it is like seeing them for the first time ... rapid heartbeat and loss of breath! To make my trips more fun, I have been cataloguing the many different variations I have seen of *N. ampullaria* (and *N. rafflesiana*, but that is another story). So far I have located some real gems - all green with ruby peristomes, all bronze, all green, a near all-crimson red form and everything in between.

As a footnote, one of the four *ampullaria* plants that has upper pitchers is close to being destroyed, literally inches away. Roadwork crews in updating and widening roadways clear off all plants in adjacent embankments during the course of their activities.



Figure 1. *Genlisea hispidula* were used to investigate capture of prey in comparable conditions. Their favourite menu must be different.



Figure 2. *Genlisea pygmaea* were used to investigate capture of prey in comparable conditions. Their favourite menu must be different.