

robust even after the prohibition of cattle. Bill Scholl and I visited this same site in the late 1980's and although large clones could still be found succession was well under way. I did notice a significant amount of smartweed (*Polygonum* spp.) and woody species shading the pitchers. I consider *Polygonum* to be a weedy, competitive species introduced or accentuated by the disturbance caused by pasturing. In the absence of any other management initiative low grade pasturing may be the lesser of evils for this particular site. I was once with the famous botanist Edwin Bridges in a steep hillside seepage bog of *S. alata* in a National Forest in western Louisiana. As we hiked through the site, which had burned over the winter, we found that the forest service had permitted cows to graze the bog. Pasturing in this steep slope bog was resulting in ruts and enrichment from the cows droppings. Edwin's comment in disgust was "This is completely unacceptable!"

As a final note I should mention an interesting experience we had while exploring this *S. minor* site in south Florida. When we were leaving this bog a car slowed down and stopped to observe what was going on. We drove down the road and explored another area but were forced to make a running exit due to an approaching lightning storm. At this time several murderers had made a daring escape from a local correctional facility and we were promptly pulled over by the local police as possible suspects (Fig. 2). Somebody had reported us as the escapees running out of the woods. Fortunately an error had been made and the day ended on a happy note.

Acknowledgements

Thanks to Don Schnell, Bruce Bednar, Clyde Bramblett and Manny Herrera for their review and comment. Appreciation is also extended to Media Production Services of Virginia Commonwealth University for preparing slide of *S. minor* distribution.

References

- Fernald, M.L.** 1937. Plants of the Inner Coastal Plain of Virginia. *Rhodora* 39: 386-387.
Herman, S. The Ecology of Pitcher Plant Habitats of the Southeastern United States: A Community Profile. Draft from Tall Timbers Research Station.
McDaniel, S.T. 1966. A Taxonomic Revision of *Sarracenia* (Sarraceniaceae). Unpubl. PhD. Diss., Fla. S. Univ.
Mody, N.V., Henson, R., Hedin, P.A., Kokpol, U. and D.H. Miles. 1976. Isolation of the Insect Paralyzing Agent Coniine from *Sarracenia flava*. *Experimentia* 32: 829-830.
Schnell, D. 1980. Notes on *Utricularia simulans* Pilger (Lentibulariaceae) in Southern Florida. *Castanea* 45: 270-276.
Schnell, D. 1994. Cattle As *Sarracenia* Stewards? *Carnivorous Plant Newsletter* 23: 49 - 52.

Nepenthes of Gunung Murud

John De Witte, Oststrasse 8, 77866 Rheinau, Germany

During our visit to Mulu National Park (Sarawak, Malaysia) and to Batu Lawi in the Kelabit Highlands we had seen a major summit in the distance. The mountain in question is Gunung Murud. Different sources confirm the presence of nepenthes on the summit and talk about a great variety of plant life. Our guide for Gunung Mulu also suggested that a nepenthes similar to *N. muluensis* appeared on Murud. So in planning our tour through Kalimantan and Sarawak, we scheduled for Gunung Murud.

The whole tour took my wife and myself to the Kelam in Kalimantan, to Kuching and surroundings in Sarawak and to the Kelabit Highlands.

Gunung Murud is at 2423 m (7946 ft) the highest summit in Sarawak. Historically, the first ascent was made in 1922 after a five week march from the coast. The mountain is part of the Kelabit Highland range and lies about 180 km from the sea. The lowest



Figure 1. *Nepenthes stenophylla* (?) on ascent to Murud. Photo by John De Witte.



Figure 2. *Nepenthes tentaculata* close to Murud summit. Photo by John De Witte.



Figure 3. *Nepenthes muluensis* relative on slopes of Murud. Photo by John De Witte.

part of the mountain spills over into Kalimantan (Indonesia). Access to the mountain is either from Sarawak or from Sabah.

Our starting point was to be Miri, where we picked up our guide. From there on we planned to fly to Bareo, the main longhouse center in the highlands at an altitude from 1000 meter. There we could look for *N. stenophylla*, *N. reinwardtiana* and *N. veitchii*, plants we saw on a previous trip but wanted to photograph again. The *N. veitchii* from Bareo is intermediate between the lowland version as found in the foothills of Gunung Mulu (pure epiphytes) and the highland version of Batu Lawi which typically clasp the trees in growing taller. The plants grow in a dry soil on the side of the road among shrubs and short trees and are rarely taller than 0.75 meter.

Bareo has an airfield with a grass runway and is serviced by Twin Otter planes, so when it rains the town cannot be reached. The first time we were in Bareo the field was just opened after being totally closed for one month. Of course when we were ready to leave for the highlands this

time it rained, so we had to look for an alternative.

Fortunately, Gunung Murud can be climbed from the Sabah side. The nearest village, Ba'kelalan, has a hard runway and can be reached via Lawas.

Flying in over the highland range into Ba'kelalan was impressive. The village at an altitude of 1000 meter has no longhouses anymore, and is spread over different hamlets. It is surrounded by numerous hills, and in the distance the Murud range can be seen. As we came in the morning, we had time for an afternoon walk. With a temperature of 23 deg C and slight overcast this was more agreeable than walking in the lowlands. The landscape reminds one of meadows crossed by small brooks and many of the trees carry ant plants and epiphytic orchids. After half an hour we arrived at a small forest and found *N. reinwardtiana*. As usual at this altitude, the nepenthes were growing among rhododendrons and were climbing high in the trees.

Next morning we had an early start and followed the runway in westerly direction. The first part of the hills were steep and we climbed 200 vertical meter in the first 30 minutes, which proved hard for a starter. Fortunately, after the climb we found a flatter stretch at an altitude of around 1300 meter. At this level there is no rain forest yet and we walked through tropical oak forest. We scaled the ridge and after the midday break we lost altitude again till we reached a logging road. A logging road is a stretch of forest 15 meter wide where all trees have been cleared so trucks and transporters can pass to take out the cut trees. Rain caused erosion and at many locations land slides had taken out part of the forest and blocked the road. Rain also caused the clay to stick to our shoes, tripling their weight and making walking very difficult. We saw no nepenthes that day, apart from a single pitcher, but unfortunately the dry state made correct determination impossible. From the single pitcher, however, we saw a similarity with the species which goes under the umbrella of *N. stenophylla* at the first ridge of Gunung Api (Mulu National Park). The same red color was apparent on the remaining parts of the pitchers. We descended again (funny how easy we always seemed to lose the altitude we just had laboriously gained) and camped for the night at a small river.

After a rainy night under tarpaulins we continued west through the oak forest. In the middle of the morning at 1400 meter we found our first nepenthes, a single plant. The first impression was *N. stenophylla*. The difference between it and the same species from Boreo however is striking. The lid is more triangular than circular and the hairiness is less. Comparing descriptions and illustrations leave the possibility that this could be the original *N. fusca* as described by Danser, and there are similarities with *N. fusca* as seen on the road to Mount Kinabalu. From that point till midday, that was the only plant we saw. Then at 1730 meter the first *N. tentaculata* appeared. This species is widely distributed, and in our opinion there are small but characteristic differences between the species on each mountain.

Fifty meter higher, a species appeared that surely belongs to the maxima family, with pitchers up to 30 cm. No records are available about *N. maxima* on Gunung Murud. The hairiness of the leaves point toward *N. veitchii*, and although we might have seen some pure strains the variation in shape of the leaves and pitchers indicate that there are at least two types of hybrids involved, most probably between *N. veitchii* and *N. stenophylla* or *N. fusca*. The shapes of some leaves even suggest presence of *N. lowii* (comparable to *N. x trusmadiensis*), but this seems improbable.

The higher we climbed, the larger the pitchers of *N. tentaculata* seemed to grow. They soon reached 20 cm, which is unusual for this species.

Going slowly higher on a well trodden path we found *N. lowii* at 1860 m. The reason for the path was simple: a fundamentalist Christian movement has developed in Ba'kelalan, and Gunung Murud in a place where the villagers go to meditate and pray. They have built a second village with a large church on a plateau, so on special occasions the whole community can go up and stay for a couple of days. For the rest of the year

the buildings stand empty. This village was to be our base camp, as our guide's family lived in Ba'kelalan and of course had a house in Church Camp.

Slightly higher than the *N. lowii*, we found a nepenthes which also looked familiar. Obviously it belonged to the *N. tentaculata* group, and the coloration reminded us of it's relative on Gunung Mulu: *N. muluensis*.

Where on Mulu the plants grow on the summit exposed in the crowns of the trees and bushes, on Murud they grow in the shade of the mossy forest. The plants on Murud are darker, most probably due to the continuous exposure to UV-light at higher altitude. Comparing pictures of both plants leaves no doubt that we are looking at the same species and that *N. muluensis* also appears on Gunung Murud. It remains to be clarified if the species appears in the 75 kilometre that separate both mountains.

The tentaculata grow even larger close to the ridge, but the pitchers become so different from the normal ones that we had to think that we were looking at another species. The largest pitchers were now 30 cm, with a more round peristome and no hair on the lid. This could be sufficient difference to constitute a separate species or a hybrid. And surprisingly we found *N. reinwardtiana* close to the ridge. According to Danser this species is normally found at lower altitudes (below 1200 meter) although there is one reference to Batu Lawi, which is above 1500 meter. Nevertheless it is indeed *N. reinwardtiana*, as witnessed by the two characteristic "eyes". And it is also the other parent of the hybrid we found earlier. By comparing pitchers, we could find discern the characteristics of both parents in the hybrid.

Rain had started, and we hurried down from the ridge at 2130 meter for a descent of half an hour to the Church Camp at 1980 meter. Nobody was there and we were living in a ghost town for the next couple of days. At this altitude the day temperatures were around 18 deg C, going down to 12 deg C in the evenings.

After a chilly night we started the walk to the top. As usual however, we first went down through a small mossy forest to a stream and followed that to the riverbed. After a stretch of bare rock we found nepenthes, again the same species as the day before. *N. muluensis* appears at 2200 meter and becomes more like the relative from Mulu. The *N. tentaculata* have the largest pitchers we have ever seen, reaching 35 cm, but the plants barely grow higher than the pitchers themselves. The same stunted growth is apparent in the *N. lowii* which occupy the same site. This growth is most probably due to the harsher weather conditions at the top and the complete absence of protecting forest. The nepenthes have no possibility of climbing high and are forced to exist as ground dwellers. On the way back, the traditional afternoon rain starts and the Church Camp almost disappears in the fog.

Next day, we took it easy, climbing back to the ridge to take pictures. For the first time we see a squirrel drinking from a lowii pitcher. Hearing whistling, we search for the source, and are drawn to ground pitchers of *n. tentaculata* embedded in the moss. The sound comes from a pair of tree frogs which apparently take shelter in the pitchers. After finding the first we hear more and can easily spot them in the same area. The mossy forest stops below the top of the ridge, and a small alpine landscape appears. On the other side of the ridge the mossy forest reappears.

It looks like the rainy season has started a bit early and we are facing an important decision. If we continue to Bareo we risk the airfield being closed and we will have to walk for days back to the next field. So we decide to walk back to Ba'kelalan, leaving in the early morning well before the guides. As both my wife and myself do not like coming down the same way as going up - it can be boring - we convinced our guides to take the two day walk back in a single day. So we set a good pace, turned at the ridge and started losing altitude quickly. The path became unknown, and no nepenthes appeared where we expected them. A compass and the shade of the ridge in the distance kept us in the right direction, but we considered turning back. We had already gone down 500 meter, so would need at least two hours to recover that distance. This would mean we had to stay another night in the forest. So we continued following the

sound of a little brook which we assumed would end up in the river close to the camp of the first night. And indeed we reached a junction with the old path and waited for the guides. Luckily for one day we had no rain and the logging road was dry enough to walk without too much difficulty. Again we were astonished by the erosion taking place at the sides of the road. We finally reached Ba'kelalan in the evening.

We continued the trip to Gunung Silam looking for *N. macrovulgaris*, photographed *N. vilosa* and *N. kinabaluensis* on Kinabalu mountain, and then relaxed in Singapore before flying home.

International Carnivorous Plant Conference **May 16-20, 1997**

hosted by

Atlanta Botanical Garden and the International Carnivorous Plant Society

Held at The Atlanta Botanical Garden, Atlanta, Georgia, USA

Proposed Agenda

Thursday, 15 May

6.30pm

Welcome buffet & late registration

Friday, 16 May

8.00am-6.30pm

day

6 Speakers from around the world featured throughout the followed by a poster session, plant sale (only artificially propagated plants) and ABG cp collection tour

Saturday, 17 May

8.00am-5.00pm

6 Speakers throughout the day followed by ABG cp collection tour

Sunday, 18 May

8.30am-3.45pm

6 Speakers throughout the day

Monday, 19 May -

Tuesday, 20 May

Two day field trip to visit cps in Georgia and surrounding states

Registration

Registration will cover welcome buffet, continental breakfast, breaks and box lunch and drink throughout the conference

*Registration **\$65.00**

*Field Trip (limited to 50 places) **\$120.00**(inclusive of accommodation, travel and food)

The conference organizers are not responsible for securing plant import/export permits and all delegates are responsible for travel, medical, and car rental insurance.

Please address inquiries to:

International Carnivorous Plant Conference,
c/o Steve Baker, Rt. 1, Box 540-19AB, Conover, NC 28613,
Day: 704-322-2050 9am - 5pm, Evening: 704-256-7035 7pm - 10pm