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Saving a highly endangered begonia

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BEGONIA is a group of plants that never fails to amaze me with their unique foliage and attractive features. So, when the issue of conservation was raised during the book launch of "Begonias of Peninsular Malaysia" in March 2005, I find it particularly disturbing when Dr. Ruth Kiew, the author and authority of Malaysian begonias, expressed concern that some begonias are facing near extinction due to habitat disturbances. One such species, *Begonia aequilateralis*, we were told, was once found along Sungai Kroh in FRIM. This was documented back in 1946 by Prof. John Wyatt-Smith, a forest botanist with the former Forest Research Institute. The species has not been recollected since then.

This species is obviously highly endangered. Recorded only from Sungai Buloh and Sungai Kroh in Selangor, and knowing that Sungai Buloh's forest is highly fragmented, Dr. Ruth suggested that an immediate measure would be to salvage the plants and conserve them in *ex-situ* establishments, such as botanic gardens. This will safeguard the species should its original habitats continue to deteriorate. With this in mind, we decided to launch a plant rescue effort for *B. aequilateralis*.

We sought the help of Mr Piee Abdullah, who had been involved in the begonia survey, to locate the last known population of *B. aequilateralis* in Sungai Buloh. On 15 September 2005, four of us from FRIM, Dr. Lillian, myself and two of our assistants, and Mr. Piee traipsed along a path that began near the Sungai Buloh Hospital. According to Mr. Piee, there were only eight plants present during his last visit and during that visit, he noted the stream flow was silted. We felt worried as begonias are very delicate and respond quickly to deterioration in its environment.

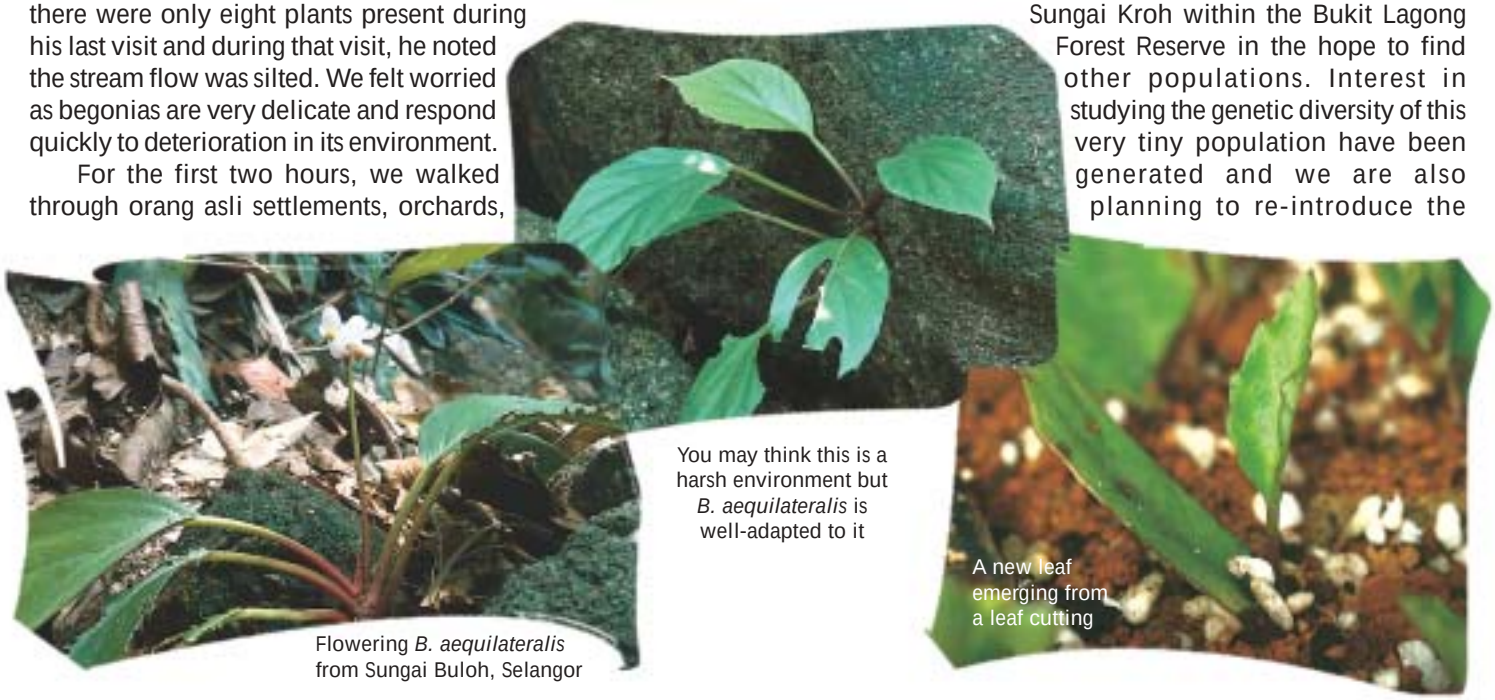
For the first two hours, we walked through orang asli settlements, orchards, belukar and secondary forest. Finding the path entrance was tricky as the belukar vegetation had engulfed the area. After much sweat, we finally hit the right track at a small waterfall. From here, we thoroughly combed the banks of the stream, looking into rock crevices and ledges where *B. aequilateralis* is known to thrive.

Very soon Mr. Piee managed to locate one plant clinging onto a rock in the stream. Upon closer inspection, we realised that one of the plants we had collected at a lower elevation was actually *B. aequilateralis*! We were naturally delighted to see that the population still exists. We counted eleven individuals, but had to decimate two plants, a flowering one to make herbarium specimen and the other to do cuttings and propagation.

Back at FRIM, I trimmed off two leaves from the plant and carefully cut them into smaller pieces. The cuttings were sown in rooting medium and placed in a misting chamber, which provided a moist and cool environment, similiar to conditions in its original habitat. After a month, the cuttings began to root followed by the production of 1-2 new leaves. It was a great relief to see new plantlets developing from the cuttings. Several months later, the cuttings were transferred from the rooting medium into individual pots.

Based on our observation on the growth of *B. aequilateralis* and experiences in handling other begonia species, *B. aequilateralis* can be considered as rather slow growing. This observation combined with a more in-depth understanding of its phenology and ecology should be able to explain its rarity.

We have big plans for *B. aequilateralis*. We will be initiating a search and mapping exercise for the species along Sungai Kroh within the Bukit Lagong Forest Reserve in the hope to find other populations. Interest in studying the genetic diversity of this very tiny population have been generated and we are also planning to re-introduce the



Flowering *B. aequilateralis* from Sungai Buloh, Selangor

You may think this is a harsh environment but *B. aequilateralis* is well-adapted to it

A new leaf emerging from a leaf cutting

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Jewels of Padawan

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Dossinia marmorata.
(A) a rare beauty
(B) Flowers


The Padawan Limestone Formation

Padawan is about 9-km drive away from Kuching the capital city of Sarawak. Padawan Formation, formerly known as Padawan Limestone Formation was formed some 195-135 million years ago during the Upper Jurassic to Upper Cretaceous geological period. It is the largest outcrop in Sarawak, spanning approximately 436.6 sq km, extending from the Indonesian border in the south to the Semadang Valley in the northwest and a narrow strip of country in Bukar Valley in the northeast (Wilford 1965).

Sarawak is home to at least 127 endemic orchid species; of these, 48 are confined to limestone areas, such as Bau, Bidi, the renown Mt. Mulu and Mt. Api, Berar and Kuap. *Bulbophyllum reticulatum*, *Dossinia marmorata*, *Paphiopedilum stonei* and *Paphiopedilum sanderianum* are some examples of the best-known representatives of the limestone species and three of them, *B. reticulatum*, *D. marmorata* and *P. stonei*, are found abundantly in Padawan.

Bulbophyllum reticulatum is an endemic species growing on rocks lined with a thin layer of soil, humus or carpet of mosses at 100-200 m altitude. It favours shady places but is also found in areas slightly exposed to sunlight. The species is rather prudent with its leaf number - it has only one leaf on top of each pseudobulb and each leaf is patterned with conspicuous net-like veins. The flower buds are strikingly red on all surfaces but unfortunately, this coloration does not last and the red hue fades off when the flower is in full bloom. Beaman *et al*. (2001) recorded the flowers as white, flushed with red dots, but the ones at Padawan are prettier with denser red spots.

Dossinia marmorata is a very beautiful jewel orchid, also endemic to Borneo. The species grows on the forest floor, mostly in shady and humid areas at 70-270 m altitude. It leaves are a sight to behold, for some appears in dull red, with green netlike veins while others are dull maroon, flushed with green around the midrib, and lined with fine copper colored net-like veins. Its spike of flowers is relatively long, up to about 38.5 cm, bearing about 23 flowers. Flowering season is from September to mid October.

Pahiopedilum lowii is a critically endangered orchid listed as one of the Totally Protected Plants under the Sarawak Ordinance 1998. The species grows in small populations, on rocky surfaces covered with little soil and leaf litter at 120-160 m. The plant resembles *Paphiopedilum stonei*, but its inflorescence and flowers are distinctly different The inflorescence of *P. lowii* may grow to 75 cm long and is hairy. The flowers are also hairy and have petals shaped like a spatula, with a twisted tip. Spots and hues of purple and green adorned the petals while the lip is light maroon.

Paphiopedilum stonei, an endemic species, is another slipper orchid listed as Totally Protected. Unlike *P. lowii*, the tip of the inflorescence is covered with black hairs. The sepals have purple stripes while the petals, sometimes

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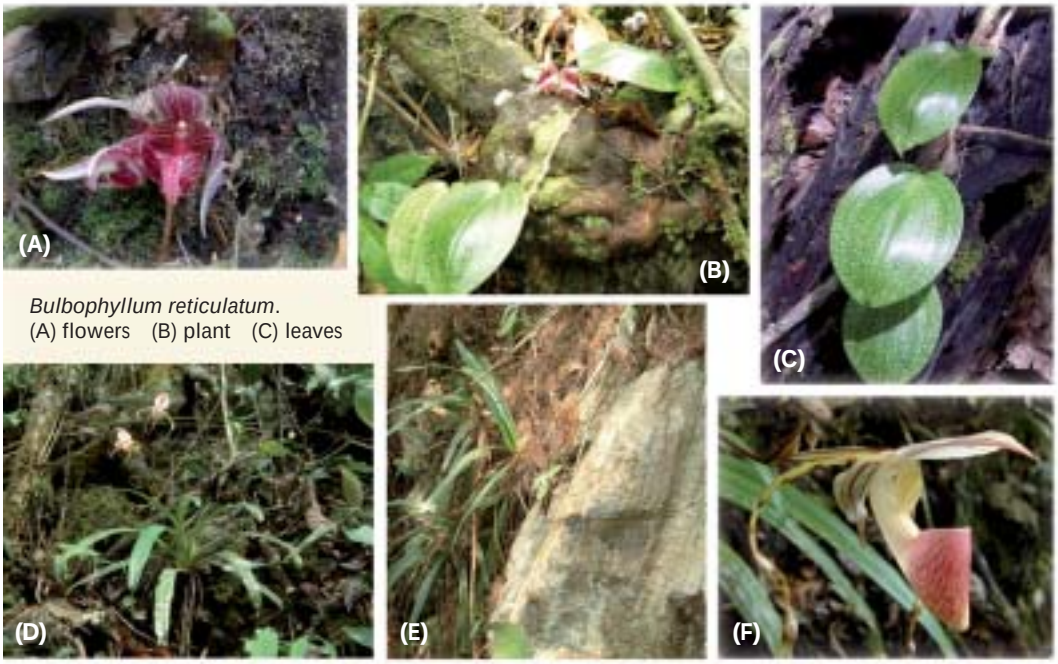
plants grown from cuttings back to Sungai Kroh. This will be our first attempt at re-introducing a rare and particularly fussy herbaceous species. If this attempt succeeds, it will not only boost the morale of conservation efforts but also will be a good educational tool for environment education and promotion of conservation awareness to the public. There is still a lot more work to do; we are keeping our fingers crossed all along the way!


Habitat of *B. aequilateralis* at Sungai Buloh, Selangor


Propagated *B. aequilateralis* at 6 months old

swollen and sometimes flattened, are dotted with dark purple spots. *P. stonei* also favors areas with moderate sunlight and good air circulation–a little help from my colleague and I in thinning the surrounding vegetation actually resulted in an increase in the number of plants!

I am certain after reading this, you will be interested to look at the plants. They are available for viewing at the Rena George Memorial Wild Orchid Garden in Semenggoh Santuary and Sarawak Orchid Garden.



Bulbophyllum reticulatum.
(A) flowers (B) plant (C) leaves

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Paphiopedilum stonei. (D) Blooming in the wild. (E) Growing on the limestone cliff (F) An inspiration for shoe designers?
(G) *Paphiopedilum lowii* blooming in the Sarawak Orchid Garden. (H) Because they are so precious, they needed to be protected — At the Rena George Memorial Wild Orchid Garden

Where is Gunung Aais and what is there…?

By Noorsiha Ayop (noorsiha@frim.gov.my)

Thanks to the Gunung Aais Scientific Expedition, we now have the answers to the above questions.

The reserve lies in the district of Jerantut in Pahang and is crowned by Gunung Aais, a fairly low summit of 816 m altitude. Located between Sungai Tembeling and Sungai Lurut and bordering Taman Negara, it is geologically made up of igneous body of porphyritic granitic rock. The reserve covers approximately 79,793 ha of primary rain forest and is partly gazetted under the functional class of soil protection forest.

The banks of Sungai Tembeling are inhabited by at least 40 villages, believed to have occupied the area since early 1800s'. Local communities, particularly the Malays, actively used the area as a hideout and access route into Terengganu during the Japanese occupation. Now they venture into the reserve primarily to fish and collect honey from tualang trees (*Koompassia excelsa*). Being adjacent to Taman Negara also helps in improving their livelihood through ecotourism and building of boats.

A scientific expedition was conducted from 3 July to 10 July 2004. The travel to the base camp at Jeram Perahu was ardous–a more than 100 km bumpy ride along logging roads in Tekam and Tekai Forest Reserves followed by a boat ride to Jeram Perahu. Midway we stopped at Kampung Mat Daling where we were most hospitably received by the local headman. After a heartening lunch, we took a 8-km boat ride to Jeram Perahu. The expedition site is covered by primary rain forest and has no permanent villages and inhabitants.

Botanical recces along Sungai Erak, Sungai Lurut, the foothills to the summit of Gunung Aais, riverbanks and flood terraces in the vicinity of Jeram Perahu and the riparian vegetation along Sungai Tembeling provided an expansively long checklist of plants. The approximately 1,600 ha of forested area is home to some 597 taxa of seed plants from 287 genera and 91 families. 481 of the recorded taxa were dicots, while 113 and 3 were monocots and gymnosperms respectively. Of this, 65 taxa are endemic to Peninsular Malaysia. The two most diverse families were Euphorbiaceae and Palmae while the most specious genera were *Syzygium* and *Shorea*. Some very rare species were exposed–*Habenaria paradiseoides* (Orchidaceae), *Scaphochlamys laxa* (Zingiberaceae), *Anisophyllea reticulata* (Anisophylleaceae),

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Begonia rajah (Begoniaceae), *Ceratolobus kingianus* (Palmae), *Eugeissona brachystachys* (Palmae) and *Henckelia pyroliflora* (Gesneriaceae). Gunung Aais has several principal forest types and these are the lowland dipterocarp forest, hill dipterocarp forest and forest of montane elements. The hill dipterocarp forest at Gunung Aais is dominated by *Shorea curtisii* (seraya).

For the monocots, six bamboo species namely *Bambusa vulgaris*, *Dendrocalamus pendulus*, *Gigantochloa scortechinii*, *Schizostachyum grande*, *S. latifolium* and *Dendrocalamus* sp., were found together with 67 fern and fern allies' species. A total of 15 species of anurans and 6 species of lizards were recorded; most of the anurans and lizards may be regarded as forest-specific species.

The expedition area is drained by rivers and streams categorised as Class I, which complies with the Department of Environment (DOE)'s Water Quality Index Classes standard for water supply or fisheries. Translated into layman's terms, the water is safe for consumption and indeed many members of the expedition did not hesitate to drink directly from source. Fish life is abundant in the area and it is a common sight to see locals fishing along the river banks. We couldn't resist the temptation too!

In addition to an impressive list of plants and animals, its name is special as it is spelt with a double "a". This is unusual for a Malay word and if any reader knows why this is so, we at FRIM are most interested to know!

Hornstedtia scyphifera (Zingiberaceae). Flowers coming out from a watery environment. Look like cut flowers in a vase but they are not. It is an inflorescence.

Habenaria paradiseoides (Orchidaceae), a new record for Peninsular Malaysia, previously known only from Sumatera.

Fruits of *Amomum uliginosum* (Zingiberaceae)–rambutan look-alike?

Begonia sinuata var. *sinuata* (Begoniaceae), otherwise known as the Sparkling Begonia.

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