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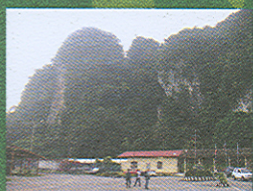
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Dr. Helena 'Leni' Duistermaat, with her collection of *Thysanolaena latifolia* at Bukit Bintang, Terengganu



Female flowers of *Spinifex littoreus* on a sandy beach at Gebeng, Pahang



Gua Musang, where *Neyraudia arundinacea* (L.) Henrard var. *zollingeri* (Buse) Henrard, which is native to Peninsular Malaysia, is found growing on a limestone outcrop.



The population of *Spinifex littoreus* is found growing luxuriously along a sandy beach by the roadside on the way heading to Jambu Bongkok Forest Reserve, Terengganu



Learning about grass

THE FLORA OF PENINSULAR MALAYSIA

By Ruth Kiew (ruth@frim.gov.my) & Rafidah Abdul Rahman (rafidah@frim.gov.my)



Ruth Kiew



Rafidah Abdul Rahman

Time is ripe for a new, comprehensive and up-to-date Flora. The most recent Flora, *The Tree Flora of Malaya* in four volumes (1972-1989) included only trees more than 10 cm dbh with rather brief descriptions and minimum citations as befits a flora tailored for foresters, and, of course, it did not include climbers, herbs, shrubs and ferns. For these, we still have to go back to the earlier Flora of the Malay Peninsula published in five volumes by Ridley (1922-1925), which included gymnosperms and flowering plants, and is now grossly outdated. The ferns have been better dealt with by Holttum (1968) in *Flora of Malaya: Ferns* but changes to family concepts necessitate a new account.

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IN SEARCH OF GRASSES

By Yao Tze Leong

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'WHY INCLUDE WEEDS?' This is a question we're often asked, especially in a forestry institution, where they do not have priority. However, weeds are indeed part of the local flora—some are indigenous but still more are naturalised*, particularly of disturbed and open areas. They also pose a potential threat because they can rapidly invade areas, smothering or out-compete crops, and hence cause economic loss. In natural vegetation, they can become a conservation concern.

We have little information about the weed diversity in Malaysia and where they can be found because basically, who wants to fill up the herbarium with weed specimens?

This was the problem faced Dr Helena 'Leni' Duistermaat when she started to revise the grasses, Gramineae, for the Flora. The solution was to go into the field to collect. We went to some botanically interesting areas, such as limestone hills, quartzite ridges, mountains, heaths, and sandy and rocky beaches, but undoubtedly the best places to collect grasses in terms of species number were roadsides and waste areas. We concentrated on the east coast of the Peninsular as almost nothing had been recorded from this area.

In six days, we visited four states and collected 135 specimens representing at least 70 species in 46 genera. This abundance was entirely due to Dr Leni's expertise, for while to the layman 'all grasses look the same', to her keen eye they represented a wide diversity. Particularly memorable was her ability to identify grasses from a moving vehicle. "Stop! There's something new." she would often cry out.

The trip was tremendously fruitful. Besides building up a representative collection in the Herbarium at FRIM (KEP), many new records were added to the Terengganu and Kelantan grass flora—at least 32 species. It is interesting to note that these new records were almost all common species. In Kelantan, *Centotheca longilamina* is a very interesting new record because it is a poorly understood taxon for which little material is available. In the list of new records is the sinister *Pennisetum polystachion*, an invasive species. Dr Leni was particularly delighted to find wild rice, *Oryza ridleyi*, growing in a remnant of swamp forest in a rubber estate in Kelantan. We sometimes forget how dependent we are on grasses for food and that rice had originated from the wild. One new record for Peninsular Malaysia, *Panicum laxum*, was also found in Kelantan. It is only the second record for Asia.

Concern was expressed for *Pennisetum polystachion*, a species thought to have been introduced as a fodder crop during the colonial era. In Singapore, it was first recorded in 1929 and after a lag of 30 years, was found naturalised, and thereafter spread rapidly. It was not reported in Peninsular Malaysia by Gilliland (1971 *Flora of Malaya: Grasses*). It is undoubtedly an invasive species and appears to have become more widespread in recent times and has the potential to invade natural

habitats and threaten the local flora. A case in point is the Klang Gates Ridge, where the endemic grass *Eulalia milsumii* grows. The ridge is now heavily infested with *P. polystachion*, which is out-competing native species. This invasion has occurred within the last ten years (Ruth Kiew, pers. comm.). Dr Leni suggested that as a control measure, *P. polystachion* should be regularly weeded out because the Klang Gates Ridge is a fragile habitat with a unique flora and many endemic species are found here.

It is worrying to see that in places with newly opened habitats, exotic grasses dominate. On many new highway road banks in Selangor, the alien *Pennisetum polystachion*, *Panicum maxima* and *Melinis repens* dominate. It is important to know the biology of these alien grasses before they are used on a large scale to stabilise slopes.

*naturalised means that a species, although of foreign origin, has become established and can successfully reproduce itself.

From cover page



Engrossed participants at the Lycophte and Fern Workshop, 17 August 2006



Dr Leni Duistermaat introducing participants to the world of grasses



Participants and instructors of the first Flora Writing Course



Denis Filer in action at the BRAHMS Course



Dr Saw Leng Guan presenting certificates at the BRAHMS Course



Briefing at Kenyir

The new Flora will cover 8,300 species of lycophytes (selaginellas and lycodiums), ferns, gymnosperms and flowering plants, both indigenous and naturalised, and provide detailed descriptions, critically cite pertinent literature and types, deal with nomenclatural problems, provide keys for identification and shall be well illustrated by botanical drawings and colour photographs.

The Flora project commenced towards the end of 2005. Generous sponsorship from MOSTI enables the employment of full-time staff, running of training programmes, field work and expeditions as well as covering the publication of the Flora itself. It will be produced in two series-Series I for Gymnosperms and Flowering Plants and Series II for Lycophytes and Ferns.

The Project is headed by Dr Saw Leng Guan, Head of the FRIM Tropical Forest Biodiversity Centre. Progress on the Flora is driven by input from project staff and FRIM herbarium staff, supported by revisions from taxonomists from both local and overseas institutes working on plants of the region. Dr Richard C.K. Chung, Curator of the Herbarium, besides being a major contributor of revisions, also plays a pivotal role in overseeing all aspects of herbarium management. At the national level, a Technical Committee comprising experts from local herbaria, both in the Peninsula, Sabah and Sarawak, support the project, while an Advisory Panel of international experts provides critical advice and collaborating herbaria support. The Editorial Committee handles the publication of the Flora.

The Flora has been able to benefit from the experiences garnered from The Tree Flora of Sabah and Sarawak Project and aims to match the high standards of that Flora. The Flora of Peninsular Malaysia, however, will be different in several respects. It will be produced in parts comprising 100-150 species (this is to ensure that revisions come out speedily), include distribution maps, conservation status and produced on CDs with databases of specimens examined.

The Flora team, now numbering three senior staff and nine neophytes, is working closely with the Conservation team under Dr Lillian Chua because much of the work overlaps, particularly, in the assigning of conservation status and the production of the gazetteer for Peninsular Malaysia botanical collecting localities. Changes in landuse patterns make conservation a growing concern. Data that the Flora assembles are and will be critical for knowing which species are endangered and where they can or could be found.

TRAINING

With the employment of nine staff new to taxonomy, a rigorous series of both formal and informal training is being organised. First was a course on Herbarium Management followed by two Flora Writing Courses, which comprehensively covered topics in taxonomy from nomenclature, terminology, the writing of

descriptions and keys, botanical drawing, modern family concepts, etc.

Hands-on training comes in the form of undertaking the revision of small families for the Flora, starting with one-species families and working their way up to families with two or three then five or six species, etc. Turning theory into practice can often be a revealing experience but learning through mistakes or omission is a reliable learning process.

The orchid *Habenaria paradiseoides* J.J. Smith was newly recorded for Peninsular Malaysia in 2005, and is notable for its habitat—it grows in narrow cracks in rocks on banks of large rivers with a strong current. It is a very rare species known only from very few localities in Terengganu and just over the border in eastern Pahang.



Serena Lee



Sam Yen Yen

A new taxon of *Ridleyana* (Gesneriaceae) is spectacularly beautiful with large, deep purple-black flowers and attractive foliage. Material was brought back by Sam Yen-Yen for trials in the Kepong Botanic Garden as part of FRIM's domestication project.

WORKSHOPS

From time-to-time, we shall organise workshops on pertinent topics. Our first workshop on Lycophytes and Ferns was attended by about 40 participants from Malaysian universities. The purpose of the workshop was to gather those actively working on ferns in the Peninsula in order to get the Lycophte and Ferns Series off the ground. The keynote speaker was Dr Barbara Parris, who gave an overview of the families and their genera that will be treated in the Flora. Several speakers gave presentations on the family or genera they are revising, which was followed by discussion on the format for descriptions, illustrations, and conservation status. Participants ended by indicating which families they intended to revise for the Flora, which if all goes



Kamarudin Salleh

Dr Richard Chung teaching botanical collecting in the Ulu Gombak Forest Reserve.

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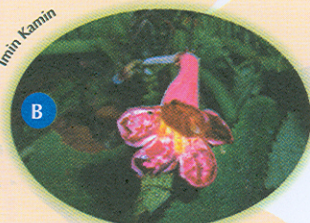


Fructing head of *Etlingera maingayi*, widespread in Peninsular Malaysia.



Sam Yen Yen

A



Imin Kamin

B

Henckelia atrosanguinea
(Gesneriaceae)
(A) Plant (B) Flower



Sam Yen Yen

Henckelia miniata (Gesneriaceae) spectacular when in full flower, is a rare and endemic species, which prior to the Kemaman trip, was known only from the foothills of Bukit Bauk, Terengganu.

as planned, is more than ample for the first part to be published. We look forward to receiving the manuscripts!

Dr Helena 'Leni' Duistermaat from the National Herbarium of the Netherlands and author of *The Field Guide to the Grasses of Singapore* conducted a three-day course 'Introduction to Grasses', opened to participants from local institutes and universities. It was a steep learning curve needing familiarity with the specialised parts of the grass inflorescence and flower with a lens always at hand. A big change from learning about trees by slashing the bark with a parang!

BRAHMS (Botanical Research and Herbarium Management System) continues to be an indispensable tool for the Flora, particularly for the preparation of specimen labels, specimen databases and distribution maps. A course was therefore organised to provide an introduction to the programme taught by Denis Filer from Oxford University, the originator of the programme. This was opened to participants, not only from FRIM, but also from collaborating herbaria in Malaysia.

With conservation status being included in the Flora, it was necessary to have a good grasp of what the IUCN categories mean and to understand the criteria used to designate them. To this end, Dr Lillian Chua gave the team a one-day course on how the international system of Red List Categories works and how to assess the conservation status of individual species using the form the secretariat has prepared.

FIELDWORK

Four aims guide our choice of localities for collecting plants. They are:

1. areas that have never been botanically explored ('blanks on the botanical map');
2. specialist trips to collect a particular group of plants or critical species or to visit type localities;

3. conservation (to revisit areas that have suffered degradation or are threatened or to attempt to locate rare or endangered species); and
4. co-operate with other organisations that request a particular area be surveyed.

Many field trips have been carried out so far.

New localities. A new road is being constructed around the east and north of Tasik Kenyir to link Kuala Terengganu to Gua Musang. The eastern part is now completed and opens up an area that has not been botanically collected before. The team visited the area to make as complete an inventory of all fertile materials as possible.

Although 2006 was not a good year for flowering and fruiting in trees because it followed a heavy-flowering year, the area we explored has a rich ground flora, including several Terengganu endemics. Notable species collected included the orchid *Habenaria paradiseoides* J.J.Smith and a new taxon of *Ridleyana* (Gesneriaceae).

Specialist trips. Two such trips were organised for Dr Barbara Parris of the Fern Research Foundation, New Zealand, who is revising the fern family Grammatidaceae for the Flora (pg. 4), and Dr Leni Duistermaat, who needed to make comprehensive collection of grasses, which are poorly represented in the herbarium (pg. 1).

In parallel with these, a series of one-day field trips was organised to different forest types, where collecting and preparation of herbarium specimens were taught and identification of a wide range of families were tackled.

Conservation. A trip was organised by Sam Yen-Yen to revisit Bukit Kajang and Sungai Ayam, Kemaman District, Terengganu, an important type locality for several species, which, when it was botanically explored in the 1930s, proved to be an area with exceptionally high local endemism. In the 1930s, the low-lying area was being mined for tin that was taken out to the river on a small railway track. Apart from the area being



actively mined, the surrounding hills and rivers were pristine. Now, all signs of the railway track are gone and are replaced by a network of logging roads. The area had been logged twice. Disappointingly, none of the endemic species, particularly palms and herbs, originally described from the area could be relocated. However, the trip was not without its reward. The most notable find was a population of *Henckelia miniata*, spectacularly in flower.

Collaboration. The Herbarium regularly receives requests to identify plants, for example for nature trails, medicinal plant gardens, etc., and this responsibility often falls on Kamarudin bin Saleh whose wide knowledge is based on more than twenty year's service in the herbarium and collecting and identifying literally thousands of specimens. His botanical experience is invaluable in training the new staff in plant identification.

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SEARCHING FOR GRAMMITIDACEAE

By Nor Ezzawanis Abdullah Thani
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Grammitidaceae are small to very tiny ferns. Most occur in the rain forests on tropical mountains as epiphytes or growing on rocks. Malaysia is one of the centres of species richness.

Dr. Barbara Parris, the Malaysian expert on Grammitidaceae, was appointed as a FRIM Visiting Research Fellow between 5-27 August 2006. For the revision, intensive field work to search for rare or critical species (i.e., those that require intensive study, especially on their wild populations) was carried out at Gunung Ulu Kali in Selangor, Cameron Highlands (Gunung Brinchang and Gunung Berembun) in Pahang, and Gunung Hijau in Perak.

Working with an expert was an excellent experience to learn not only about these tiny ferns, where the microscopic hairs and scales are important characters, but also about ferns in general. The specialist will often spot rare species, instantly recognise interesting ones, new records or even new species, and will know in which habitats they are likely to be found.

Our field work of only four days resulted in relocating rare species like *Xiphopteris sparsipilosa*, an endemic species in the Peninsula; *Calymmodon curtus*, endemic to the Peninsula that was previously known only from Gunung Tahan and Gunung Ulu Kali; *Grammitis caespitosa*, a new record for Peninsular Malaysia; and most exciting of all, materials of one new endemic species!

On the downside, Taiping Hills (Bukit Larut) proved to be a disappointment. Dr Barbara had a list of species previously collected from Gunung Hijau and 'The Tea Gardens'; the area is considered a classic botanical locality from where many species have been described. The good news was that once again, *Calymmodon curtus* was found here in the lower montane forest. The bad news was the entire summit of Gunung Hijau is developed and not a remnant of the upper montane forest on it, nor the grammitids previously recorded from it, remain.

The Tea Gardens was a disappointment. This is the only locality where the endemic *Grammitis crispata* had been collected in 1891 and 1924. Unfortunately, our careful scrutiny around the area ended up with no success. Its habitat, originally a forest stream, is now a polluted concrete drain, and the surrounding forest is severely degraded. The population here is probably extinct but we are hopeful that in the near future, the species may appear in similar habitats elsewhere!

Thanks to Barbara, her expertise has enabled us to know the species better in the field. From the conservation viewpoint, her visit absolutely opened our minds to the importance of conserving habitats for the effective conservation of ferns. Very often, just like the endemic *Grammitis crispata*, we have only the old herbarium specimens to represent their existence.



Prosaptia contigua—in Peninsular Malaysia, only known to occur from Perak, Pahang, Terengganu and Selangor.



Grammitis reinwardtii collected from the upper montane forest of Gunung Ulu Kali.



Prosaptia obliquata, usually epiphytic on trees and only once recorded from rocks in a stream.



Dr Barbara



Endemic Grammitis

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PUBLICATIONS

Our first publication was produced in May when The Guide to Preparing Manuscripts for the Flora of Peninsular Malaysia and the project poster were produced. The poster in particular has been well received and has helped to glamorise the project.

After a year of intensive training and with their first family under their belt, the team is poised for many years of taxonomic revision interspersed with botanical collecting.

We look forward to producing the first parts of both Series I and Series II in the later part of 2007.



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