

Research Bulletin

Faculty of Resource Science and Technology



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Some *Coelogyne* spp. of Sarawak
(photograph courtesy of Qammil Muzzammil Abdullah)

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Dean's Message

Prof. Dr. Shabdin Mohd Long

Universiti Malaysia Sarawak has been ranked among the top 200 Asian University by the QS Asian University Rankings 2011 and Faculty of Resource Science and Technology (FRST) was ranked top 115 by QS Asian University Rankings 2011. Faculty members should be proud on our standing and this was achieved due to high commitment and enthusiasm of all staffs. I am sure with strong commitment and hard work we can achieve even better ranking.

In line with the university's vision to become a research university by 2015, the faculty greatly supports any initiative to bring advancement in research and development (R&D) and teaching. Various strategies and plans have been mapped out in tandem with the university's endeavour to spur and harness competency in R&D, science and technology, and capacity to innovate.

Being one of the twelve mega biodiversity countries in the world, we place a lot of emphasis on sustainable utilization, prudent management and conservation of our rich natural heritage. In order to utilize and manage our biodiversity sources, FRST is taking necessary action to establish another Centre of Excellence in addition to Centre of Excellence for Sago Research (CoESAR). CoESAR research focus on various aspect of sago especially agronomy, molecular genetics, starch technology and utilization. It is no doubt that the establishment of new Centre of Excellence will promote research activity and collaboration with other established centre and also focused research which will have significant impact on research, development and commercialization.

My sincere hope that all academic staffs will show high commitment in order to achieve excellent performance in teaching, research, publication, consultancy and public services.

Please feel free to direct your enquiry to me at e-mail: lshabdin@frst.unimas.my or to the editorial members for further information.

Happy reading

Artemia salina indicated the potential of the oil as antitumor and pesticidal agents (Ishrak *et al.*, 2000).

Antitermite activity

The method established by Sakasegawa *et al.* (2003) was used for antitermite assay against *Coptotermes* sp. for 3 days at 1, 10 and 100 µg/mL concentration. The leaf oil showed inhibitory activity against the termites with 100% mortality after 3 days of treatment with LC₅₀ value of 63.10 µg/mL. The result showed the potential of the leaf oil for further development as environmental friendly termiticidal agent.

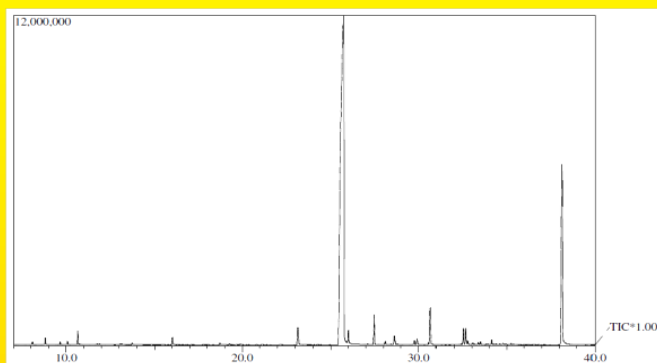


Figure 1: GC/MS Chromatogram for the leaf oil of *C. zeylanicum*

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The role of palaeofloras and Bornean aroids in the investigation of phytochores

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It was Edred J.H. Corner who first drew attention to the partial commonality of the tree floras of the E and NW coast of Peninsular Malaysia and that of N Borneo, and postulated this to be a result of these areas sharing remnants of a once extensive expanse of lowland humid forest and river deltas centred on what is now the South China Sea (Corner, 1960). Corner coined the name the 'Riau Pocket' for this, now fragmented, phytochore. Remarkably, for more than 40 years no-one picked up on Corner's landmark but much-overlooked paper. The intimation that interest was reviving in the exciting prospect of being able to study extant fragments of a "lost" biosphere joining the archipelagic and mainland elements of the Indomalaya Ecozone was a paper by Wong Khoo Meng (Wong, 1998) dealing with patterns plant endemism and rarity in Malaysia. Somewhat later still Peter Shaw Ashton (Ashton, 2005) mapped the known extent of the extant Riau Pocket fragments, and linked them to the known phytochores for Borneo. Between these papers, and subsequently, there have been a number of general and not a few specific studies drawing further reference to the importance of palaeobiogeography and modern distributions of taxa in SE Asia (van Welzen *et al.* 2003, Roos, 2004, van Welzen & Slik 2009, Raes *et al.* 2009), although none except Atkins *et al.* (2001), attempted phylogeographical analysis, and none has specifically analysed the veracity of the putative Riau Pocket phytochore fragments.

In order to attempt a phylogeographical study of disparate floristic fragments it is necessary to have a large and speciose taxon with an established phylogeny in which is combined deep (i.e., old) stem clades and recent, ideally species-rich, crown clades. Ideally too, the crown clades should include a high percentage of endemics together with a scattering on wide-spread species. The Araceae (aroid) flora of Borneo is universally acknowledged as one of the richest and most diverse on the planet, with 36 genera, of which 35 are indigenous, and one (*Typhonium* Schott) genuinely naturalized. Of the 35 indigenous genera, eight (*Aridarum* Ridl., *Bakoa* P.C.Boyce & S.Y.Wong, *Bucephalandra* Schott, *Ooia* S.Y.Wong & P.C.Boyce, *Pedicellarum* M.Hotta, *Phymatarum* M.Hotta, *Pichinia* S.Y.Wong & P.C.Boyce, and *Schottariella* P.C.Boyce & S.Y.Wong) are Bornean endemics. Currently there are 670 indigenous aroid species recorded for Borneo, of which more than 40% are undescribed novelties. Significantly this figure is based substantially on our understanding of the flora of Sarawak, Sabah and to a much lesser degree Brunei (i.e., less than one third of the total landmass). Kalimantan, comprising more than 70% of the land area of Borneo remains very poorly known, and undoubtedly harbours a great many novel species. It is estimated that the total aroid flora for Borneo quite likely exceeds 1000 species, with barely one third of these described. Borneo is thus an aroid habitat of global significance, and arguably one of the richest and diverse on the planet.

One of the largest and most diverse aroid taxa on Borneo is the Schismatoglottideae, a robustly monophyletic clade sister to Cryptocoryneae that, together Neotropical *Philonotium*, comprises the Schismatoglottid Alliance. Species of Schismatoglottideae are in the main adapted to riverine humid lowland forest ecologies, notably gallery forest and particularly in Borneo often occurring as obligate or facultative rheophytes. Many Schismatoglottideae species are of highly restricted distribution, often on particular geologies and not infrequently occurring allopatrically and parapatrically as 'guilds' of morphologically similar species.

Molecular and palaeo-eco-geographical data support that the Schismatoglottid Alliance is very old, with diversification of the Neotropical and Palaeotropical clades pre-dating the break-up of the southern supercontinent of Gondwana (ca 120 MYA). Stem clades are in the main somewhat more recent, although the deepest (e.g., *Apoballis*) are doubtless nearly contemporary to the preliminary Neo-Paleotropical separation. By comparison, evidence suggests that most crown clades are of recent separation/radiation, in some instances (e.g., those present in the Lambir Formation) perhaps less than 20KA, although most are more likely diversifications dating from 2–4 MYA. This combination of an ancient origin with much more recent diversification makes analyses of Schismatoglottideae a potent tool to investigate the medium term to recent origins of the mesophyte biota of the perhumid forests of Sunda and thus gain understanding of the occurrence and demarcation of phytochores. Preliminary evidence is that much of the most recent species diversification coincides with times of low sea levels in Sunda that were occasioned by periods of glacial maxima in the northern hemisphere.

It is still early days in the study, but already it is clear that the modern Schismatoglottideae flora of Borneo results from a mosaic of evolutionary radiations occurring in a series of pulses, with the earliest >2MYA, and the most recent probably <20KYA. The Bornean Riau Pocket fragments postulated (based on tree floras) by Ashton are broadly supported and exemplified by the presence of *Phymatarum* M.Hotta (Figure 1) in the east and a profuse assemblage of taxa in the *Schismatoglottis multiflora* and *S. asperata* complexes in the NW, together with *Aridarum* Ridl. sect. *Aridarum*, and the Elongata complex of *Piptospatha* N.E.Br. The Lupar Line is maintained, although in a somewhat modified form, with its southern extremity now terminating above the Ai river, and with the area to the E and SE of this termination marking the edge of a new phytochore along the Sungai Sarikei and its associated catchments and probably extending through the saddle of the Kapuas Hulu to the Muller and Schwaner ranges, and extending to the Kapit side of the Sungai Song. This new phytochore is exemplified by the genera *Schottariella* (Figure 2) and *Schottarum* (Figure 3). Predictably the cohesiveness of the Rejang drainages (i.e., east of the Sungai Song and west of the Balui drainages /Hose Mountains) is well-supported, with signature Schismatoglottideae being *Aridarum* sect. *Caulescentia* M.Hotta (Figure 4), among others. With the possible exception of links to Niah and Bukit Satiam (Bintulu) the Mulu

phytochore seems independent of the main Sarawak aroid flora and instead is allied, via the Setap Shales to that of SW Brunei. Typical of the Mulu phytochore are species allied to *Schismatoglottis dilecta* S.Y.Wong, P.C.Boyce & S.L.Low (Figure 5).



Figure 1: *Phymatarum borneense* M.Hotta



Figure 2: *Schottariella mirifica* P.C.Boyce & S.Y.Wong



Figure 3: *Schottarum sarikeense* (Bogner & M.Hotta) P.C.Boyce & S.Y.Wong



Figure 4: *Aridarum caulescens* M.Hotta



Figure 5: *Schismatoglottis dilecta* S.Y.Wong, P.C.Boyce & S.L.Low

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constructive criticisms from the participants as well as non-participants had motivated the organizer to further improve future JSCU and most likely JSCU will be FRST yearly-event.



Science requires accurate measurement... practice makes perfect!



Enjoyable moments trapping the insects using light trapping technique.



Just like school children, soil particles are small but strong!



Plants do not need soil to grow?



Small mammals are not scary monsters; they are actually our interesting cousins!



Who is going to be the next Professor?

Junior Science Camp UNIMAS 2011: 'Learning SCIENCE IS FUN'

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The Faculty of Resource Science and Technology (FRST), Universiti Malaysia Sarawak (UNIMAS) has successfully organized the Junior Science Camp UNIMAS 2011 (JSCU 2011) on the 9th and 10th April 2011 at the External Laboratory, FRST, UNIMAS. This two-day camp was designed to nurture interest among young budding scientists of tomorrow by giving them opportunities to experience life as science university students on day-to-day basis. The programme has also allowed the faculty to outreach the community outside UNIMAS, by promoting academic programmes offered by the faculty besides raising awareness on local flora and fauna diversity and other science-related matters.

JSCU 2011 involved 60 primary six students and 4 teachers from SK Green Road Kuching supported by 75 staffs and graduate students of FRST. The carefully-planned activities of JSCU were based on school curriculum, combining hands-on laboratory sessions (Aquatic Science, Animal Science, Chemistry, Biotechnology, Plant Science and Mathematics), field work and motivation talk, as below:

No.	Title	Resource Person(s)
A. Laboratory sessions		
1.	Aquatic Science and Daily Life	Dr. Siti Akmar & Dr. Ruhana
2.	Animal Science and Diversity	Dr. Ramlah & Dr. Yuzine
3.	Chemistry	Dr. Chin Suk Fun
4.	Biotechnology in the Kitchen	Dr. Azham Zulkhamain
5.	Plant and Soil Properties	Dr. Effendi Wasli, Mr. Abas Said & Ms. Morgeret Sidi
6.	Playing with numbers – The Power of Prediction	Mr. Charlie Laman, Ms. Siti Nur Lydia & Mr. Mohd Nasarudin
B. Field Experience		
1	Frogging and Insect trapping	Dr. Ramlah, Mr. Wahap Marni & Mr. Mohd Jalani Mortada
2	Fun in Bird Watching	Dr. Lim Chan Koon & Ms. Zahrunisa Abd Rahim
C. Motivational Talk		
1	Past, Now and Future Kids	Prof. Dr. Mustafa Abdul Rahman
2	Road to Professorship (Entomology)	Prof. Dr. Sulaiman Hanapi

Based on survey carried out at the end of JSCU 2011, majority of the participants enjoyed themselves and value the experiences gained. Positive feedback and several