# Conservation Malaysia

ISSN 1823-7975

## A Bulletin Supporting Plant and Animal Conservation in Malaysia

Issue No. 4 (2007)


## DIAMONDS OF THE FOREST

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Have you ever seen a shrub palm, usually 2–3 m tall with big 'diamond' shaped leaves? If you happen to see one, it is most probably *Johannesteijsmannia*, because this feature is characteristically distinct in the genus. Its flowers are cream yellow, bisexual, clustered in inflorescences, and emit a strong, sweet-sour smell. The mature fruits are about 4–5 cm in diameter, brown, corky and hard-seeded.



*Johannesteijsmannia altifrons* A. the plant. B. the inflorescences. The leaves come in handy during thunderstorms.

The genus *Johannesteijsmannia* belongs to the order Principes, family Palmae and subfamily Coryphoideae. Initially named *Teysmannia* after a Dutch botanist, J.E. Teysmann, it was later renamed *Johannesteijsmannia*. In the revision, John Dransfield added three new species to the genus, making it four altogether and Malaysia is proud to have them all, i.e., *Johannesteijsmannia altifrons, J. magnifica, J. perakensis* and *J. lanceolata*. The plants are known as 'Joey' in the West, while in Malaysia, several names are used, e.g., kor, wud, sal, sang, payung or segaloh, depending on species and location.

*Johannesteijsmannia lanceolata, J. perakensis* and *J.magnifica* are endemic to Peninsular Malaysia and they commonly inhabit primary forests. *Johannesteijsmannia lanceolata* is distributed in Selangor, Pahang and Negeri Sembilan while *J. magnifica* occurs in Selangor, Perak and Negeri Sembilan. They are limited to small pockets in certain valley slopes. *Johannesteijsmannia perakensis*, thought to be endemic to Perak, was recently reported in Kedah. It is found in valleys and also on flat ridge tops in Kledang Saiong Forest Reserve. *J. altifrons* is more widespread and abundant—it is found in north Sumatra, southern Thailand and Malaysia ( Kelantan, Terengganu, Johor, Pahang, Perak, Selangor and Sarawak).

*Johannesteijsmannia perakensis* has a trunk, while the rest are apparently acaulescent with the stem growing below ground. Only *J. lanceolata* has long tapering leaves, while the rest of the species have diamond-shaped leaves. *Johannesteijsmannia altifrons* looks like *J. perakensis* but has no trunk. If you spot *J. magnifica*, you will be awed by its beauty – it is a giant palm that reaches 4–5 m tall in fertile valleys and has grey hairs on its lower leaf surface.

The big, broad leaves of *Johannesteijsmannia* are much valued by the orang aslis and local communities for roof thatching, which can last for several years. The plants are also used in decorations and landscaping. In Kelantan, the fruits of *J. altifrons* are used as herbal medicine by the Chinese community.

Makes a cosy hut for a homestay programme


*Johannesteijsmannia magnifica*. A. the plant. B. the inflorescence and infructescence bearing young fruits. Note the characteristic whitish undersurface of leaves.


*Johannesteijsmannia perakensis* A. the plant. B. the inflorescence. The only *Johannesteijsmannia* species with a trunk


*Johannesteijsmannia lanceolata*. A. the plant. B. the inflorescence.

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# INTEGRATING LASER RANGERFINDER, GPS AND GIS. TREE MAPPING FOR CONSERVATION AND MONITORING OF THREATENED PLANTS

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**IN THE EARLY 1960's**, manual compass and diameter tape were used to measure tree location in the forest and the position was plotted using rulers and pencils. The manual production of map, especially in a large study area may need a large number of cartographers and considerable amount of time and money. Depending on the size of the study area, it is possible that even before the task is completed, the resources will have disappeared.

Nowadays, tree mapping in a forest is easily done with the use of Laser rangefinder, Global Positioning System (GPS) and Geographic Information System (GIS).

Fig.1. MapStar Angle Encoder & Map Star Compass

Fig. 2. An example of GPS and DGPS Equipment

The integration of Laser Rangerfinder, GPS and GIS technologies allows the production of accurate maps in a shorter period of time. Maps generated by these technologies give an overall view of the species distribution, habitat and their relationship with the environment.

## LASER RANGEFINDER

Laser rangefinder has become an important tool for mapping. The word laser stands for Light Amplification by Stimulated Emission of Radiation and it is used to calculate bearing, distance and slopes between selected targets. Laser will calculate distance by measuring the time of flight of very short pulses of infrared light. Since all solid objects will reflect back a certain percentage of the emitted light energy, the distance is calculated by using the constant speed of light.

There are many types of Laser rangefinder, examples available in the market are the MapStar Angle Encoder and Map Star Compass (Fig.1). The MapStar Angle Encoder calculates a turned horizontal angle and can be referenced to any desired point. It works with Impulse lasers, and the modular design allows it to pivot the laser a full 90 degrees up or down while maintaining the rotary encoder level for the greatest possible accuracy. It is important to note that this equipment is not affected by local magnetic interference, making it perfect for use in crowded urban areas as well as in the forest. For increased versatility, the system's data output format is compatible with most field data collection software and GPS.

## GLOBAL POSITIONING SYSTEM (GPS)

**Global Positioning System** (GPS) is satellite-based technology which is widely used in surveying throughout the world. The GPS allows users to determine longitude, latitude and altitude in any weather, day and night anywhere on Earth. GPS has become a vital global utility, indispensable for modern navigation on land, sea, and air around the world, as well as an important tool for map making and land surveying. **Differential Global Positioning System** (DGPS) is an enhancement to GPS that uses a network of fixed ground-based reference stations to broadcast the differences between the positions indicated by the satellite systems and the known fixed positions. DGPS offers a higher accuracy of location data. This accuracy may be up to centimeter accuracy.

In tree mapping process, tree distribution data collected by Laser rangefinder will then be tied up with a coordinate acquired from the GPS so that data can be overlaid with another

*From cover page*

Preliminary phenological studies of *J. lanceolata, J. magnifica* and *J. perakensis* showed that mature palms had an average number of 26–39 leaves per crown. Leaf growth rate differed among species; *J. magnifica* and *J. lanceolata* produced about 4 new leaves per year, while *J. perakensis* about 6 leaves per year. The flowering and fruiting patterns varied among the species, i.e., *J. lanceolata* flowered and fruited frequently throughout the year, *J. perakensis* twice a year and *J. magnifica* once a year. *J. altifrons* apparently flowered throughout the year as well, as observed in the limited number of individuals planted in FRIM. Potential pollinators observed were bees (Hymenoptera), mainly *Trigona* species, flies (Diptera), beetles (Coleoptera) and probably ants (Hymenoptera) too.

*Johannesteijsmannia lanceolata* and *J. magnifica* have been listed as endangered while *J. altifrons* and *J. perakensis* are listed as vulnerable in the 1994 IUCN Red List. Collection of the palms and/or seeds from the wild for ornamental trade has been reported, and this practice may put these palms at a risk of over-exploitation. These beautiful palms can be in great danger of extinction if their habitats are disturbed. They do not seem to tolerate open gap exposures, and clearings of forest canopy have been observed to damage plants severely. Being an important species in the wild and in human environment, the species should be given appropriate conservation considerations in forest management.

**REFERENCES:**

Dransfield, J. 1972. The genus *Johannesteijsmannia* H.E. Moore, Jr. *Garden's Bulletin, Singapore* 26: 63-83.

Uhl, N.W. & Dransfield, J. 1987. *Genera Palmarum.* Allen Press, Lawrence.
Johnson, D. (ed.). 1996. *Palms: Their Conservation and Sustained Utilization. Status Survey and Conservation Action Plan.* IUCN, Gland, Switzerland and Cambridge, United Kingdom.

layer in GIS. An example of DGPS equipments available in the market are Trimble R8 which allows users to acquire centimeter accuracy and is widely used for surveying purposes; and Garmin Etrex Summit which allows the user to acquire 30-meter accuracy and is widely used for recreation purposes. (Fig. 2)

## GEOGRAPHIC INFORMATION SYSTEM (GIS)

**Geographic Information System (GIS)** is a facility for preparing, presenting, and interpreting facts that pertain to the earth surface. It is also an information system that is designed to work with data referred to spatial or geographic coordinates (DeMers 2000). In other words, a GIS is both a database system with specific capabilities for spatially reference data, as well a set of operations for working with data.

GIS is both an analytical and communication tool, which allows individuals to understand and see relationships that would otherwise be difficult to grasp. Nowadays, GIS has become an important tool for plant biodiversity and conservation efforts because of its ability to display map, present location information, species richness and display plant distribution patterns. With the spatial and attribute data stored in the databases, GIS is a useful tool for forest conservation and management.

## MAPPING OF THREATENED PLANTS FOR CONSERVATION AND MONITORING

It is well known that one of the causes of plant rarity is the decline in the species' natural habitats. Therefore, conservation of natural habitats becomes important to protect threatened plant species.

One of the strategies in biodiversity conservation is to establish protected areas–to support decision-making, ground evidences on species populations are crucial. Tools provided by Laser Rangefinder, GPS and GIS allow these to be documented and the datasets manipulated to answer questions related to policy and management. Maps generated by the integration of these techniques help the forest managers in making the right decision as these systems highlight the most important areas to be conserved and managed for the purpose. In addition, these maps are extremely useful for forest managers in managing sensitive areas and facilitating conservation efforts for threatened plants.

**Fig. 3. The spatial distribution of *Vatica yeechongii* in Setul Forest Reserve, Negeri Sembilan**

**Fig. 4. Population of *Vatica yeechongii* in Sungai Lalang Forest Reserve, Selangor**

**Fig. 5. Distribution of *Dryobalanops beccarii* in Panti, Kluang and Labis Forest Reserve, Johor**

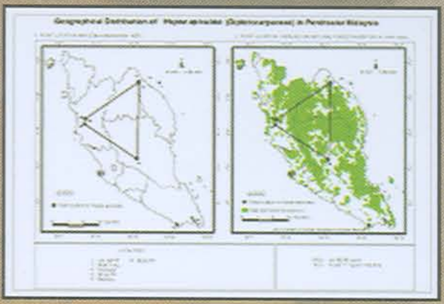

**Fig. 6. EOO and AOO of *Hopea apiculata* in Peninsular Malaysia**

The great appeal of GIS is its ability to integrate large quantities of information regarding the environment and provide a powerful range of analytical tools to explore these data. Fig. 3 and Fig. 4 illustrate early conservation efforts for *Vatica yeechongii*, which is known to occur only in Setul Forest Reserve, Negeri Sembilan and Sungai Lalang Forest Reserve, Selangor.

The same technique was carried out with populations of *Dryobalanops beccarii*. This species is known to occur only in Panti, Kluang and Labis Forest Reserve, Johor. The GIS maps show not only the habitat of these species but other layers of the surrounding area such as compartment boundaries, rivers, roads, contours and transmission lines (Fig. 5).

The analytical tools are heart of GIS. Apart from producing maps, GIS is able to answer queries and analysis. In FRIM, spatial analysis was used while preparing Extent of Occurrence (EOO) and Area of Occupancy (AOO) maps for species threat assessment. Fig. 6 shows EOO and AOO of *Hopea apiculata* derived from GIS spatial analysis extension of ArcView GIS software.

**Fig. 7. Individual trees of *H subalata* in Compartment 14, Kanching Forest, Selangor**

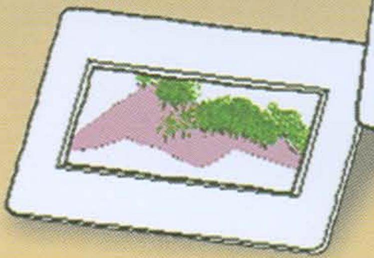

**Fig. 8. Individual trees of *H subalata* in Compartment 2, Kanching Forest Reserve, Selangor**

For planning and management purposes, GIS can be viewed either in 2-Dimension or 3-Dimension. ArcGIS 3D Analysis extension can be used to plot 3-Dimension of spatial features. An example of the 3-Dimension view was applied for the distributions of *Hopea subalata* in Compartment 14 (Fig. 7) and Compartment 2 (Fig. 8), Kanching Forest Reserve. *H. subalata* is a small tree, with maximum height of 12 m and 35 cm diameter at breast height. It is interesting to note that *H. subalata* is endemic to Peninsular Malaysia and known to occur only in Kanching Forest Reserve (Chua *et al.* 2004).

**References:**

DeMers, M.N. 2000. Fundamentals of Geographic Information System. USA. John Wiley & Sons.

Chua, L.S.L, Nurulhuda, H., Hamidah, M. & Saw, L.G. 2004. Conservation Status of *Hopea subalata* (Dipterocarpaceae) in Peninsular Malaysia. Journal of Tropical Forest Science 16(3): 271-282.

# CARNIVORE SPECIES FOUND IN ARTIFICIAL HABITAT: A GOOD SIGN?

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Plantation forests such as *Acacia mangium* have increased substantially in area, both in Sarawak and Sabah. In the Bintulu Division, the development of Acacia plantations is one of the major forestry activities as it can produce both wood and pulp within an eight-year rotation. The challenge for these plantations is to maintain both economic harvest and wildlife diversity. One does wonder whether such widespread land-use change continues to provide suitable habitats for wildlife.

To find out, a monitoring study on wildlife using remote cameras was initiated in February 2005, in the Acacia plantation of the Forest Department Sarawak's Planted Forest Zone (PFZ). Conducted in collaboration with the Conservation and Research Centre (CRC), Smithsonian Institution, USA. DeerCam (Non-Typical Inc. Park Falls, Wisconsin, USA), the remote camera approach, was chosen because it is the most economical and effective tool to determine the presence of elusive or rare species of mammals. Many mammals are nocturnal, and also react to hunting by avoiding humans whenever possible, making ordinary walking surveys often rather unproductive.

The study areas were located near the Samarakan portion of the PFZ, approximately 45 km south-southwest of Bintulu town. All camera trap sites were marked using Global Positioning System (GPS).

Several types of commercially available, rather glamorously named scent lures were used to make the camera sites more attractive to mammals, e.g., Magna Glan, Midnight Mist and Powder River. The lure was smeared on a small stick placed near the center of the camera detection range.

Banded palm civet, *Hemigalus derbyanus* sniffing the scent bait

Tangalung or Malay Civet, *Viverra tangalunga* photographed in Acacia block

Malayan Sun bear, *Helarctos malayanus* exclusively photographed in the Acacia plantation

An elusive Marble Cat, *Pardofelis marmorata* photographed in the Acacia plantation

A Leopard Cat, *Prionailurus bengalensis* foraging in Acacia plantation

Quite surprisingly, eight species of large to medium-sized carnivores were recorded throughout the period of about eighteen months. This included Sun bear, Yellow-throated marten, Common palm civet, Banded palm civet, Short-tailed mongoose, Semi-collared mongoose, Leopard cat and Marbled cat.

The frequent occurrence of some species in the Acacia blocks indicated that the plantation does continue to serve as habitat that provides shelter and food for some species, especially Common palm civet (*Paradoxurus hermaphroditus*) and the Malay civet (*Viverra tangalunga*). Ants and termites that thrive in woody branch or old stump debris seem to attract Sun bears (*Helarctos malayanus*).

The plantation habitats do seem to support a significant number of certain types of wildlife such as medium-sized carnivores that appear to tolerate or even reside in the plantations despite the seemingly radical difference in the environment between Acacia plantation and the natural forest.

Clearly, there is still much to be learned towards conserving and maintaining mammal diversity, especially for carnivores, in such landscapes, but considering the likelihood that such habitats are rapidly becoming widespread, the more we know the more we will be able to take the appropriate steps towards effective conservation management.

**THE EDITOR,** Conservation Malaysia Bulletin, Forest Research Institute Malaysia, 52109 Kepong, Selangor D.E. (attn: Dr. Lillian Chua lilian@frim.gov.my or Dr. Saw Leng Guan sawlg@frim.gov.my.) Conservation Malaysia is distributed free of charge upon request. We welcome any contribution and feedback. Send contributions or address comments and queries to the editor. Past issues are available at http://www.frim.gov.my/tfbc. Funded by the Ministry of Plantation Industries and Commodities Design by Aslina bte Baharum (FRIM) and Printing by Ampang Press Sdn. Bhd.