

RE-DISCOVERY OF TWO RARE PLANTS FROM PULAU LANGKAWI

Rafidah, A.R. (rafidahar@frim.gov.my), Ong, P.T., Tan, J.P.C & Ummul-Nazrah, A.R.

The Langkawi Archipelago, situated in the Andaman Sea off the northwest coast of Peninsular Malaysia, is known to support a disproportionately large number of rare and endemic plant species. This is in part due to its diverse geology that includes sandstone (Gunung Machinchang), granite (Gunung Raya) and extensive limestone outcrops and in part due to its northern location. Its flora includes elements of continental Asian flora that are not found elsewhere in Malaysia.

Although the flora of Langkawi has been quite well studied, there are still plants that have not yet been collected. Recent field visits to Gunung Machinchang and Selat Panchor, Langkawi, resulted in the discovery of two rare plants. These rare plants had previously not been collected probably because they were seldom seen flowering or fruiting.

***Boeica brachyandra* Ridl. (Gesneriaceae)**

Boeica with 12 species is a continental Asian genus with just two species in Malaysia, both of which are endemic. *Boeica nutans* is known only from Gunung Korbu, Perak while *B. brachyandra* is known only from Gunung Machinchang, Langkawi, Kedah. *Boeica brachyandra* was first described by Ridley from a plant collected by C. Curtis and cultivated in the Penang Botanic Garden where it flowered in 1901. Although Burt and Woods discovered the other three gesneriads which were described from Curtis's collection during their visit to Machinchang in 1962 (Burt, 1977), *B. brachyandra* was, however, not encountered. During an inventory of the Machinchang Range in 2000, Chua and her team successfully re-collected *B. brachyandra* in fruit (Chua *et al.*, 2005). Recently in 2014, the FRIM botany team visited Machinchang and collected sterile *Boeica* plants to grow in the FRIM nursery. After a few months, the plants started to flower, and could be identified as *B. brachyandra*, the rare and endemic *Boeica* from Langkawi. It is a stemless herb with woody roots and attractive bluish flowers. For the first time, we were able to photograph the plant in full flower. It is easy to grow (J.P.C. Tan, pers. observation) and has potential as a pot plant because it flowers continuously in the nursery. Although its native population is small and restricted, it is protected because Gunung Machinchang lies within the Langkawi Geopark.



The habit and flowers of
Boeica brachyandra (in the nursery).

***Strobilanthes peninsularis* Terao (Acanthaceae)**

Strobilanthes peninsularis was first collected from limestone rocks on Selat Panchor, Langkawi (Batu Ayam and Pulau Timun) by M.R. Henderson in November 1934, followed by E.J.H. Corner in November 1941. This species was not mentioned by Ridley (1923) in his Flora of the Malay Peninsula, nor by Chin (1977) in his checklist of limestone plants. In fact, it was described as a new species in 1983 by H. Terao who recognised it as the same as the species that grew in Peninsular Thailand (Terao, 1985) which at that time was still unnamed. Small populations of the plant grow in rocky crevices on limestone hills near the sea on Selat Panchor. However, Selat Panchor is not gazetted under Langkawi Geopark and is probably earmarked for the development of a resort, chalets and other uses. During a FRIM field trip in November 2013, plants were observed in flower and we were able to photograph them for the first time. In China and Java, some species of *Strobilanthes* have a pliestial life history, which means that they grow for several years without flowering; then all plants in the population flower at once and die (Prof Deng Yunfei, pers. comm.). Can the reason that it flowers so infrequently explain why it has been so rarely collected? Further observations are needed to determine whether *S. peninsularis* has a pliestial life history.



The habit and flowers of *Strobilanthes peninsularis*.

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Ridley, H.N. 1923. *The Flora of the Malay Peninsula* Vol. II. L. Reeve & Co. Ltd., London, pp. 571-576.

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Digital Photography as an Alternative in Phenological Studies

Yong, W.S.Y. (wendy@frim.gov.my)

How to reach the canopy of a tall tree? This is one of the biggest obstacles faced by the researcher who carries out phenological studies on tall trees such as the Dipterocarps. Traditionally, detailed qualitative (occurrence of leaf flushing, flowering and fruiting event) and quantitative (e.g. amount of leaves produced and abscised) data could only be obtained using a tree tower or canopy walkway. However, these facilities are only available in established permanent research plots such as the Pasoh Forest Dynamics Plot in Negeri Sembilan and Lambir Hills Forest Dynamics Plot in Sarawak, Malaysia. So, is there any tool that we can use to collect phenological data at ground level? The answer is yes. A compact long-zoom digital camera provides the means for canopy observation and data collection even from ground level. While this method is not perfect, the captured images provide baseline and preliminary data when tree towers and canopy walkways are not available. The use of a digital camera can be quite flexible depending on

the purpose of the study. I started to use a compact long-zoom digital camera for monitoring leaf phenology of *Dipterocarpus sarawakensis* in Jerangau Forest Reserve (FR), Terengganu, Malaysia, in 2011 and it has been my best companion in the field ever since. *Dipterocarpus sarawakensis* is an emergent tree and it starts producing flowers when it reaches a height of about 15 m. It is quite challenging to make phenological observations from the ground using binoculars alone as it is almost impossible to detect the early stages of bud break which is very crucial to the study. This is because the terminal bud of *D. sarawakensis* has both vegetative (to produce new leaves) and floral (to produce inflorescence) primordia. When the terminal bud breaks (becomes active), both the vegetative buds and the floral buds may develop simultaneously to produce new leaves and inflorescences. Failure in detecting the early bud break stage will result in the omission of the inflorescence developmental stage which is only four weeks before the flowers open.

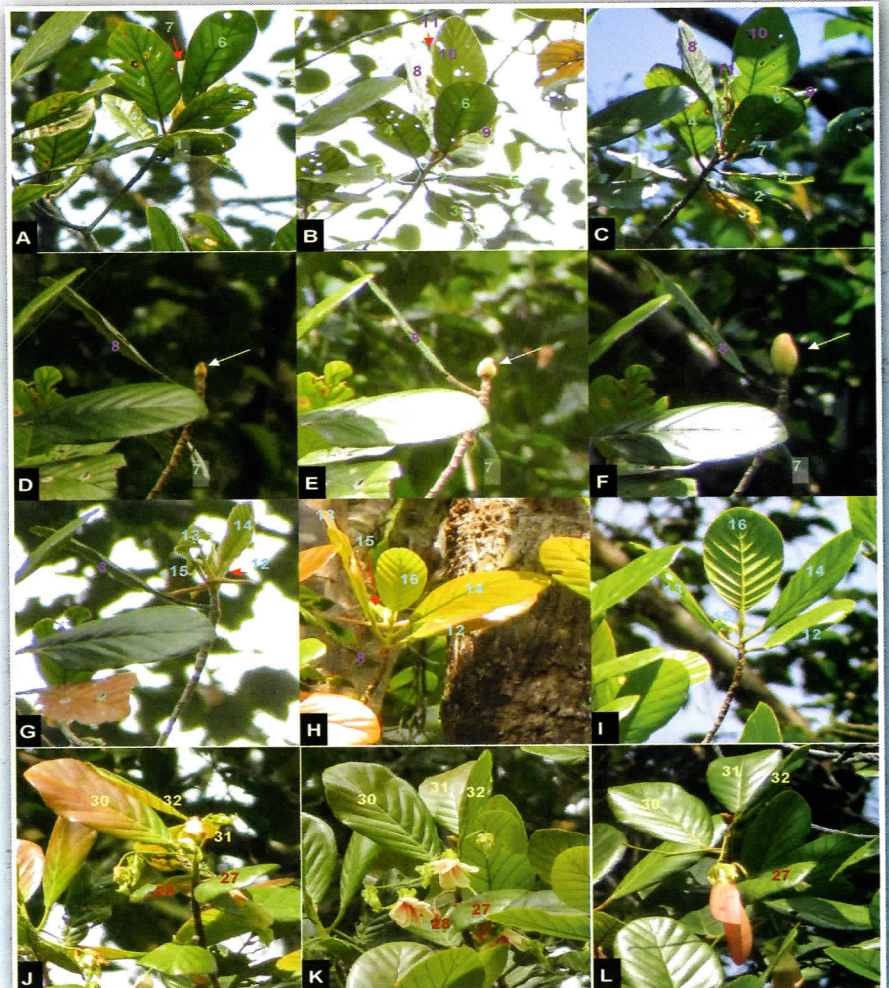


Shoots selected for monitoring which have been digitally tagged.

The first compact digital long-zoom camera I used was the Canon PowerShot SX 30 IS (35x optical zoom). This was subsequently upgraded to a more advanced model with longer zoom capability which was the Canon PowerShot SX50 HS (50x optical zoom). These cameras are easy to use and they capture good images even at their maximum zoom. Sometimes a high amount of graininess (noise) may appear on the image, e.g. when the photograph is taken in low light on a cloudy day. However, the qualities of the images are not jeopardized and are still able to provide crucial information.

The methodology is simple. One main branch from the top, middle and bottom layer of the canopy is selected to represent different light exposures. A total of 20 to 30 shoots are then selected for observation. These shoots must be clearly seen from the ground. Each shoot is photographed biweekly or monthly during the non-flowering period and weekly during the flowering period. Each leaf is then digitally tagged and numbered in the image using word processor or image editing software. Different font colours are used to differentiate leaves produced during different leaf flushing episodes.

Images of different stages in leaf flushing of Twig A2 as indicated by arrows. A. Bud active, B. Emergence of new leaves, C. A leaf turned brown, close to abscission, D. Bud, brown when dormant, E-F. Bud, green when beginning to develop (active), G-I. Leaf exchange during leaf flush, J-L. Both new leaves and inflorescences are produced simultaneously in the same flushing episode.



Bud stage (dormant or active), standing leaf number per shoot, number of leaves emerged, and number of leaves abscised during each observation are recorded. The estimated leaf life span is measured as the duration between emergence and abscission of an individual leaf. The digital image is also used to assess the degree of damage in young leaves. This information is very useful in studying the influence of leaf damage on leaf life span.

However, digital photography has its limitations. It is only applicable in studies that do not need actual measurements of the size of the bud, leaf area and shoot elongation. Due to limited visibility from the ground, this method is only suitable for trees with large leaves and less dense crowns. Therefore, digital photography is not meant to substitute the use of tree towers and canopy walkways in phenological studies but can be a simple alternative method to facilitate qualitative and quantitative phenological data collection.



Compact long-zoom cameras.



THE REBRANDING OF MALAYSIAN BIODIVERSITY CLEARING HOUSE MECHANISM WEBSITE

Hamidah, M. (hamidah@frim.gov.my) & Yasser, M.A.

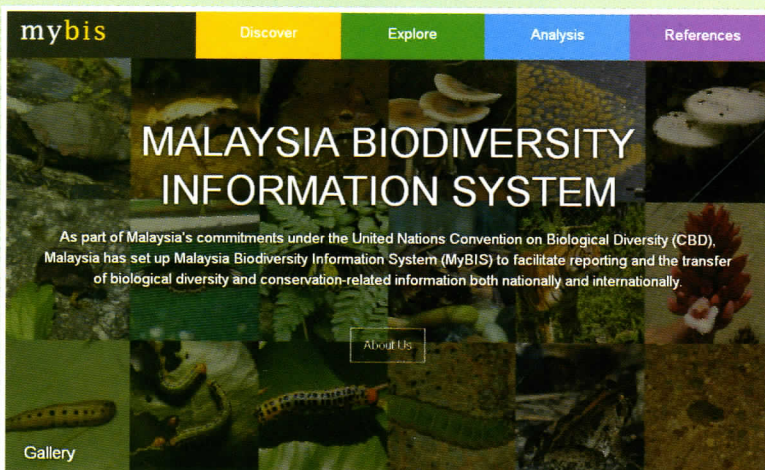
The Malaysian Biodiversity Clearing House Mechanism (MyCHM) website was a repository for Malaysia's biodiversity database. The first phase of MyCHM was launched in 2008 by the Minister of Natural Resources and Environment Malaysia. MyCHM Phase 1 focused on databases for flora and fauna and could be accessed via www.chm.frim.gov.my. From the website, users could access several biodiversity databases which were linked to photographs and a newsletter. The website also provided links to multilateral agreements which are pertinent to Malaysia, and to other biodiversity websites that contain information on Malaysian biodiversity. Initially access was only given to registered users but this was subsequently dispensed with and thereafter all users were given free access.

In 2010 MyCHM Phase 2 was launched to facilitate easier public access to biodiversity data and to achieve the Ministry of Natural Resources and Environment's aspirations of turning the website into a one-stop repository for Malaysian biodiversity information. MyCHM Phase 2 incorporated smart search features that eased data maintenance and facilitated the updating of data to reflect the most recent taxonomic revisions. It also focused on enriching scientific data and photographs on Malaysian biodiversity with an enhanced search engine. Several new modules were

Content Management System development and MySQL 5.5 for database. Development of web interface was made using Bootstrap 3.0 framework that supports a responsive interface for desktop, tablet and mobile displays, in large or small resolution.

The aim of rebranding this website is to reflect its function as a one-stop repository for biodiversity information in Malaysia. The new name for the website is Malaysia Biodiversity Information System (MyBIS) and it is now available free to the public via www.mybis.gov.my. A hibiscus which is Malaysia's national flower was chosen as the MyBIS logo to symbolise the networking amongst various agencies in Malaysia through information sharing systems to collate data on biodiversity.

The main focus of the third phase is to provide statistical analysis on biodiversity data and advance searches, as well as to make the website more user-friendly. Four main modules were developed, namely, Discover, Explore, Analysis, and References. Sub-modules such as Species, Protected Areas, Experts, Specimen, Photo, Relations, Structure, Glossary, Newsletters and Literature were also introduced. Species is the unique identifier in MyBIS and information will be regularly updated to enable advanced searches and statistical analysis, including the distribution of



The main interface of MyBIS



Responsive interface for mobile and tablet

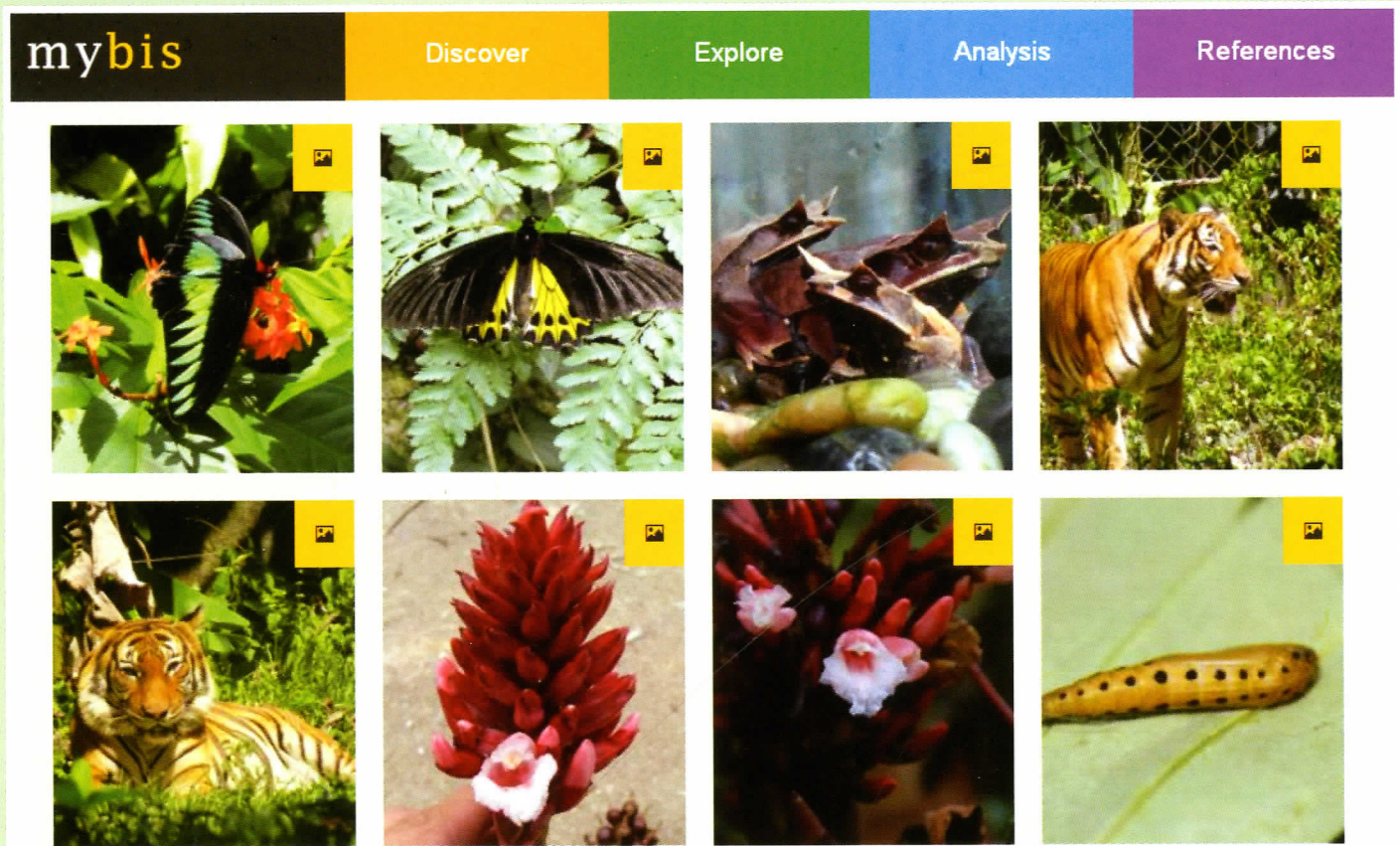
introduced in the website such as the Taxon Data Information Sheet (for biodiversity assessment), Spatial Data for Malaysian Protected Areas, Biodiversity Expert, Newsletters & Publications and E-reference.

With the increase in biodiversity data and the need to introduce data analysis, the third phase of the application was developed in 2014. MyCHM Phase 3 was developed using Open Source technology such as PHP 5.5 programming for

endangered and endemic species. The database now records more than 36,000 species of animals, fungi and plants as well as 2,000 photos which should reach a total of 5,000 photos by the end of the year.

mybis		Discover	Explore	Analysis	References
Home		by Species	Malaysia	Dataset	Experts
About Us		by Photo	Protected Areas	Maps	Literature
Contact Us		by Relations		Timeline	Glossary
Sitemaps		by Structure			
REGISTER	LOGIN	Search Species name, Common name or Taxonomy			Q

Modules developed in MyBIS



Some of the photos in the Photo gallery in MyBIS

The development of the current system is in line with Malaysia's National Policy on Biological Diversity which is to enhance scientific and technical knowledge and provide educational, social, cultural and aesthetic values of biological diversity to society. With the database freely available online, MyBIS

provides easy access and updated information on Malaysian biodiversity. It is also part of MyBIS team's vision to have the output from this website adopted into the conservation and sectoral planning strategies of Malaysia.

Explore more in this website. We hope that you will find this portal useful and informative.



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New Plant Records

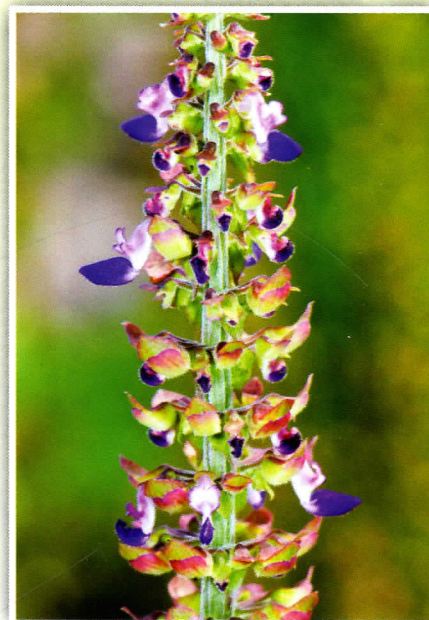
Three New Labiatae Records for Malaysia

Ruth Kiew (ruth@frim.gov.my)

Two of the new records, *Plectranthus monostachyus* and *Salvia misella*, belong to genera that are well known as ornamental plants in Malaysia, while the third, *Stachys sylvatica*, belongs to a genus better known for the medicinal uses of its species. Although *P. monostachyus* is a very recent introduction, it has naturalised and spread extremely rapidly and threatens to become an aggressive and noxious weed in plantations, nurseries and waste ground. *Salvia misella*, also recently naturalised, does not appear to be spreading widely. *Stachys sylvatica*, recorded at one locality in Cameron Highlands, Pahang, has not spread from the location from where it was first recorded, so it cannot yet be considered as naturalised.



Plectranthus monostachyus established in an oil palm estate (Photo Ong P.T.)



Flowering spike of *Plectranthus monostachyus* (Photo Ong P.T.)

Plectranthus monostachyus (P.Beauv.) B.J. Pollard (Labiatae)

Kew Bull. 56 (2001) 980; Chung Y.S. *et al.*, Nature in Singapore 8 (2015) 1–13.

Malaysian specimens: Peninsular Malaysia — Johor, *Senterre et al.* s.n. 30 September 2003 (KEP); Selangor, Rasa, *Kiew FRI 65542* 17 April 2010 (KEP); Selangor, Subang, *Rafidah et al. FRI 75694* 4 April 2013 (KEP); Kuala Lumpur, Bukit Nanas FR, *Norzielawati et al. FRI 83050* 10 June 2015 (KEP); Kelantan, Gua Musang, Felda Chiku 8, *Nazarul et al. FRI 83177* 31 August 2015; Selangor, Kepong, Forest Research Institute Malaysia, *Kiew FRI 81947* 13 Jan 2016 (KEP).

Perennial herb with stems to 50 cm tall; leaves with petiole 1–3.5 cm long; lamina broadly ovate, 5–8.5 x 4.5–7.3 cm, base truncate to cuneate, narrowly decurrent into the petiole,

margin crenate; spikes terminal, erect, unbranched, 8–29 cm long with well-spaced rings of two opposite cymules each with 3–5 flowers; flowers small, calyx two-lipped, to 2.5 mm long, corolla to 10 mm long, abruptly curved, tube and upper lobes white, lower lip 3–4 mm long and deep purple.

Distribution. Native in tropical West Africa, *P. monostachyus* is a new record not only for Peninsular Malaysia and Singapore, but also for the Malesian region. First collected in Peninsular Malaysia in 2003, it has since become widespread and is often extremely common where found. No doubt when it is recognised, it will be reported from many other localities too. It has not yet been recorded from Sabah or Sarawak. It was first seen in Singapore in 2006 (*Lee & Leong SING 2006-96*, SING) and by 2009 it was already widely distributed to many localities (*Chung et al.*, 2015).

Ecology. Waste ground and cultivated areas, in fully exposed to lightly shaded conditions. As yet it is known only from the lowlands. It begins to flower when 10 cm tall. The seeds are sticky (they are surrounded by a mucilage layer that expands when wetted) so may be dispersed by animals or in water, but long distance dispersal is probably effected by soil being carried on vehicles. Whatever the method, its seed dispersal is very effective as seen by its rapid spread and abundance. Because of its copious seed production and small tubers, it may prove difficult to eradicate.

Plectranthus monostachyus is a very recent introduction, probably within the last 10 years. Possibly it was introduced by the horticultural trade. Its introduction is very worrying because it has become widespread in a very short time. It should certainly be on a watch-list by the plantation industry as it threatens to become an aggressive noxious weed. In Singapore, Chung *et al.* (2015) assessed it as a high risk weed.

Note. The genus *Plectranthus* is best known for coleus hybrids, *P. scutellarioides*, grown for their colourful foliage and recently for *Plectranthus* 'Mona Lavender' that is now widely grown in Cameron Highlands, and has caused confusion with the public who presume it is a true lavender, *Lavandula officinalis*. In fact, *Plectranthus* 'Mona Lavender' is a hybrid developed in the late 1990s in the Kirstenbosch Botanic Gardens, Cape Town, South Africa. Another species, *P. amboinicus*, Indian borage, thought to be native to India, has long been grown locally in home gardens for its strongly aromatic leaves that are used to make a decoction to sooth coughs and for other medicinal purposes. It rarely flowers.

Among the *Plectranthus* species grown in Malaysia, *P. monostachyus* most resembles *P. amboinicus* in its leaf shape and size, terminal spikes, small flowers with a 2-lipped calyx and abruptly curved corolla. However, it is distinctly different in its thin leaves with a faint, rather foetid smell and cymules with 3–5 flowers compared with *P. amboinicus* that has thick, succulent and strongly aromatic leaves and many-flowered cymules with 10–20 flowers.

***Salvia misella* Kunth (Labiatae)**

In H.B.K., Nov. Gen. Sp. 2 (1818) 290; Backer & Bakhuizen *f.*, Fl. Java 2 (1965); Keng, Fl. Malesiana 1, 8 (1978) 358.

Malaysian specimens: Peninsular Malaysia — Pahang, G. Senyum, Kiew *et al.* FRI 65512 28 September 2009 (KEP); Perak, Sungai Siput Utara, Gua Kelawar, Nazarul *et al.* FRI 83105 27 January 2015 (KEP); Perak, Gunung Tempurong, Tan & Kiew FRI 81825 15 February 2015 (KEP).



Salvia misella growing at the disturbed base of a limestone hill (Photo A.R. Rafidah).

Perennial shrubby herb with an unpleasant smell (like cats), to 75 cm tall; leaves alternate on one side of the stem, sticky, ovate, to 4.3 x 2.5 cm, margin serrate; spikes terminal, erect, to 20 cm long with 2-flowered cymes; calyx with sticky glands, 4–5 mm long; corolla bright blue, 8–11 mm long.



Spike of *Salvia misella* with its characteristic bright blue flowers and calyx with numerous sticky glands (Photo Ong P.T.).

Distribution. *Salvia misella* is native in tropical America and is locally naturalised in west East Java and the Lesser Sunda Islands (Backer & Bakhuizen *f.*, 1965). This is the first record of it naturalised in Peninsular Malaysia and at present it is known only from Pahang and Perak. There are no records for Sabah or Sarawak.

Ecology. In Peninsular Malaysia, it forms low thickets in open disturbed soil. It is now known from four lowland localities (three represented by herbarium specimens, the fourth observed and photographed on a small unnamed limestone hill in the Gua Kelawar area). Three are from the disturbed base of karst limestone hills and the fourth from a roadside. It is apparently a recent introduction because Gunung Senyum has been regularly visited by botanists for about a hundred years but it was only observed there in 2009. Other records are even more recent. Like *P. monostachyus* its small seeds are presumably transported in soil on vehicles, but its dispersal is less effective and it does not appear to spread locally.

Note. There are no wild *Salvia* species in Peninsular Malaysia where *Salvia* is best known from the striking red flowers of the Brazilian scarlet salvia, *S. splendens* that is commonly grown as a bedding plant in highland resorts. From all other labiates in Malaysia, *S. misella* is instantly recognized by its intensely blue flowers. Pure blue flowers untinged by purple are extremely rare in the Malaysian flora.

***Stachys sylvatica* L.**

Sp. Pl. 2 (1753) 580; Li & Hedge, Fl. China (online) 17 (1994) 179.

Malaysian specimens: Pahang, Cameron Highlands, G. Brinchang, Mohd Hairul *et al.* FRI 60879 11 February 2009 (KEP), Kiew *et al.* FRI 70467 9 March 2010 (KEP), Kiew *et al.* FRI 75727 7 November 2013 (KEP).

Perennial hairy herb, stems weakly erect, 23–36 cm tall; leaves lanceolate, 4.5–9 x 2–4 cm, base truncate, margin deeply serrate, apex acute; spikes 3–12 cm long, cymules with 6–8 flowers; calyx 6–7 mm long; corolla tubular, more-or-less straight, deep reddish purple, 15 mm long, 2-lipped; stamens 4, below the upper corolla lobe.

Distribution. Europe, SW Asia, Kazakstan, Kyrgystan, Russia, China (Xinjiang Prov.) and in Peninsular Malaysia known only from Cameron Highlands, Pahang.

Ecology. Disturbed secondary vegetation by road, outside a farm, at 1815 m altitude.

Notes. Alien weeds regularly appear in Cameron Highlands, presumably from contaminated seed batches or in planting material. Several recently introduced weeds are native in southern China. Two such examples are the willow herb, *Epilobium ciliatum* subsp. *ciliatum*, Onagraceae (Ummul-Nazrah, Fl. Peninsular Malaysia 6 (2016) in press) and the buttercup, *Ranunculus cantoniensis*, Ranunculaceae (Kiew, Malay. Nat. J. 6 (2009) 137), both of which are naturalised and are spreading rapidly and threaten to become noxious weeds. In contrast, *S. sylvatica* in Malaysia is known from a single locality and monitoring over the last four years shows that, although established, it has not spread either vegetatively or by seed. It therefore is not considered to have become naturalised. However, it is being kept under observation. Apart from this species, there are no other native or naturalised *Stachys* species in Malaysia.

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