

of the test. Samanta³ opined that the lateral cavities in *N. vredenburi* contain septal filaments. This consideration is emended here because the present study shows that the linear elements occurring within the lateral cavities are narrow ridges formed due to the localized swelling of the spiral laminae. These ridges have solid wall and may have offered support to the extremely thin bundles of spiral laminae around the lateral cavities.

Development of passageways for protoplasm movement in the lateral parts may not be solely restricted to *N. vredenburi*. Comparable cavities featured in at least three different *Nummulites* taxa from India are as follows: (i) the illustration showing numerous coarse radial cavities within the thick spiral laminae of *N. maculatus* Nuttall (see Samanta¹⁹ pl. 2, figure 2), (ii) illustrations showing coarse orifices on the test surface of *N. obtusus* (Sowerby) (see Saraswati *et al.*⁵ pl. V, figures 5 and 7) and Sengupta *et al.*²⁰ (figures 3 D–F) and (iii) the illustration showing tubular cavities in the pillars and spiral laminae of *N. boninensis* Hanzawa (see Mukhopadhyay²¹ pl. II, figure 11). Morphological details of the hitherto ignored cavities in the aforementioned taxa deserve further attention and new probe may be initiated involving other *Nummulites* taxa for assessing the actual extent of cavity development in the lateral part. The outcome of such studies can form the basis for functional analysis of superficially resembling passageways in *Nummulites*

and the lateral canals in *Ranikothalia* Caudri, *Miscellanea* Pfender and *Pellatispira* Boussac^{22,23}.

1. Vredenburg, E. W., *Rec. Geol. Surv. India*, 1906, **34**, 79–95.
2. Vredenburg, E. W., *Rec. Geol. Surv. India*, 1908, **36**, 239.
3. Samanta, B. K., *Bull. Indian Geol. Assoc.*, 1982, **15**, 21–50.
4. Samanta, B. K., Bandopadhyay, K. P. and Lahiri, A., *Bull. Geol. Min. Metal. Soc. India*, 1990, **55**, 1–66.
5. Saraswati, P. K., Patra, P. K. and Banerji, R. K., *J. Palaentol. Soc. India*, 2000, **45**, 91–122.
6. Shukla, S., *Paleontographica Indica*, 2008, **9**, 1–183.
7. Biswas, S. K., *J. Palaentol. Soc. India*, 1992, **37**, 1–29.
8. Syed, R., Sarkar, S. and Sengupta, S., *J. Geol. Soc. India*, 2015, **85**, 586–590.
9. Hottinger, L., *Mem. Mus. Natl. D'Hist. Naturelle, Paris*, 1977, 1–159.
10. Syed, R., Sarkar, S. and Sengupta, S., *Curr. Sci.*, 2014, **106**, 1130–1133.
11. Smout, A. H., *Monogr. Br. Mus. Nat. Hist.*, 1954, 1–96.
12. Haynes, J. R., *Foraminifera*, Macmillan Publishers Limited, London, 1981, p. 433.
13. Leutenegger, S. and Hansen, H. J., *Mar. Biol.*, 1979, **54**, 11–16.
14. Hottinger, L., *Micropalaentology*, 2000, **46**, Suppl. No. 1, 57–86.
15. Hottinger, L., *Micropalaentology*, 2001, **47**, 1–4.
16. Hottinger, L., Illustrated glossary of terms used in foraminiferal research; paleopolis.rediris.es/cg/CG2006_M02/
17. Racey, A., *J. Micropalaentol.*, 1992, **11**, 197–209.

18. Ferrandez-Cañadell, C. and Serra-Kiel, J., *J. Foram. Res.*, 1992, **22**, 147–165.
19. Samanta, B. K., *Quart. J. Geol. Min. Met. Soc. India*, 1981, **53**, 14–35.
20. Sengupta, S., Syed, R., Sarkar, S. and Halder, K., *Indian J. Geosci.*, 2011, **65**, 265–274.
21. Mukhopadhyay, S. K., *Rev. Paleobiol.*, 2003, **22**, 231–242.
22. Samanta, B. K., *Quart. J. Geol. Min. Met. Soc. India*, 1980, **52**, 121–133.
23. Loeblich Jr, A. R. and Tappan, H., *Foraminiferal Genera and their Classification*, Van Nostrand Reinhold, New York, 1988, p. 970.

ACKNOWLEDGEMENTS. S. Sengupta acknowledges the Research Grant of Calcutta University, Sampa Sarkar acknowledges the CSIR doctoral research grant and Rosina Syed acknowledges the RFSMS UGC doctoral research grant. SEM study was carried out in the Palaeontology Division of the Geological Survey of India, Kolkata. We also thank the reviewer for constructive comments.

Received 15 December 2014; revised accepted 22 April 2015

S. SENGUPTA*
SAMPA SARKAR
ROSINA SYED

Department of Geology,
Calcutta University,
35 Ballygaunge Circular Road,
Kolkata 700 084, India
*For correspondence.
e-mail: ssggeol@gmail.com

Conservation of medicinally important plants by the indigenous people of Manipur (*Meiteis*) by incorporating them with religion and nature worship

Conservation of natural resources has been an integral part of several indigenous communities in different parts of the world. Nature worship has been a key force in determining human attitudes towards conservation and sustainable utilization of biodiversity. Many traditional conservation practices are being followed by indigenous people around the world protecting trees, herbs, shrubs and small forest patches by dedicating them to the local deity or incorporating them with religious or associating them with evil spirits. These practices have immen-

sely contributed to the conservation and protection of biodiversity. Various communities in India follow nature-worship based on the principle that all creations of nature have to be protected. They also follow a close ritualistic association with many plants and trees and grow them around the house. The sacred plants are commonly grown in homestead garden in clean surroundings. These plants are sacred to various communities and groups depending upon mythological beliefs. One of the reasons for their sacredness may be due to believed association with

some deity. For example, Bael tree (*Aegle marmelos*) with Lord Shiva, and Tulsi (*Ocimum sanctum*) with Lord Krishna. Trees sheltering certain objects of worship like a deity or a weapon (e.g. trident) have traditionally been considered sacred by many communities. Some plants are believed to have originated from body parts of Gods and therefore have sanctity—the flame of the forest (*Butea monosperma*) is believed to have originated from the body of Lord Brahma; the Rudraksha tree (*Elaeocarpus ganitrus*) from the tears of Lord

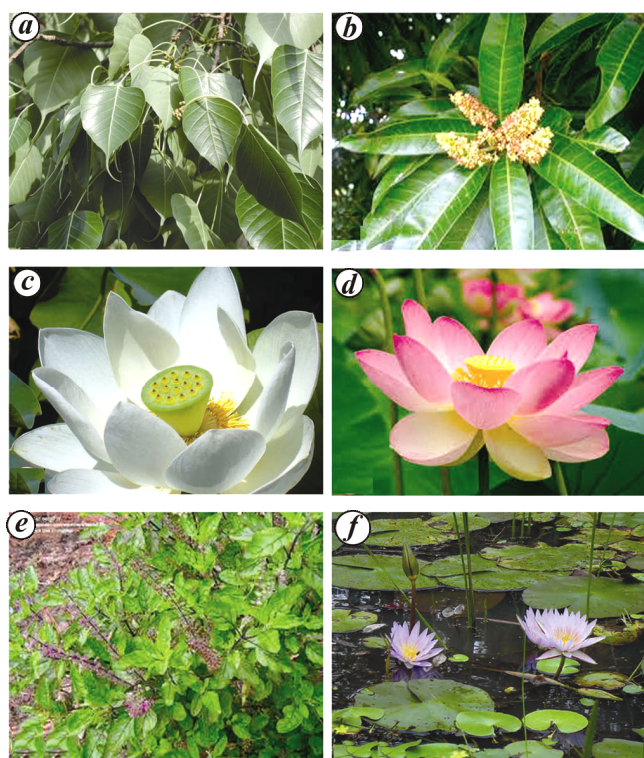


Figure 1 a–f. *a*, *Ficus religiosa*; *b*, *Mangifera indica*; *c*, *Nelumbo nucifera* (white); *d*, *Nelumbo nucifera* (red); *e*, *Ocimum sanctum*; *f*, *Nymphaea nouchali*.

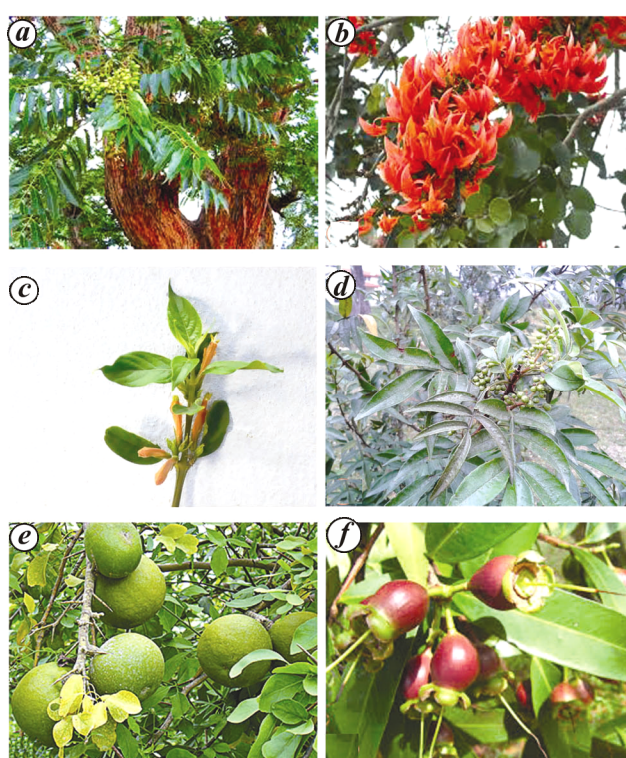


Figure 2 a–f. *a*, *Toona ciliata*; *b*, *Butea monosperma*; *c*, *Phlogacanthus thyrsifloris*; *d*, *Zanthoxylum acanthopodium*; *e*, *Aegle marmelos*; *f*, *Syzygium jambos*.

Shiva. Some plants became sacred because of what is believed to have occurred in their proximity; for example, the peepal tree (*Ficus religiosa*), under which Gautama Buddha is believed to have attained enlightenment. Plants which have socio-economic significance or a major role in the local ecology are also considered sacred. For example, the veneration for Khejri tree (*Prosopis spicigera*) by the Bishnois of Rajasthan is related to the crucial role the tree plays in the desert ecology. It provides the community with food, fodder and building material¹. Here we present trees, plants and groves protected by *Meiteis*, the indigenous people of Manipur.

The state of Manipur is situated in the extreme north-eastern corner of India. It lies between 23°80'N and 25°68'N and 93°03'E and 94°78'E. The state has international boundary with Myanmar in the east and national boundary with Nagaland, Mizoram and Assam. The total geographical area is 22,327 sq. km and it lies 790 m above sea level. It is predominantly a mountainous state with a central bowl-shaped valley covered by the deposits of alluvial soil. The state can be divided into two major regions

namely the central valley with an area of 2230 sq. km (10.02%) and surrounding mountains covering an area of 20,089 sq. km. According to the census of India 2011, the population of Manipur is about 2.722 million. The state has 29 scheduled tribes, 7 scheduled castes, *Meitei Pangals* (Manipuri Muslims) and *Meiteis*. Majority of *Meiteis* are Hindu by faith, although a large proportion of *Meiteis* follow a synthesized form Pre-Hindu and Hindu religion. A good section of them carry pre-Hindu beliefs. Most of the tribal people of Manipur who inhabit the hilly districts follow Christianity.

Manipur, by virtue of its physical characters, is graced with rich floral and faunal resources. There are different types of forests ranging from tropical to sub-alpine types. Manipur belongs to the region which is located at the confluence of two tectonic plates (the Burmese and Indian) and is a composed trans-Himalayan Geological formations that originated from the sea of Tethys of Precambrian period (about one billion years old). The region has been the Vavilovian centre of origin of a variety of angiospermic plants. The soils of the state are of two major types, residual and trans-

ported, which cover the hill areas and the central valley respectively². The climate of the area is monsoonic with warm moist summers and cool dry winters. Mean annual rainfall is ca. 1400 mm, most of which is received between May and September. Except in winter, when the temperature occasionally drops to 0°C, the climate is conducive for luxuriant growth of plants.

Plants under the present study were identified adopting 'spot identification' method through herbarium preparations and consulting of books. Medicinal properties including ethno medicinal values of the plants were ascertained^{3–7}. A cross section of the local people were interviewed in person using questionnaires. Traditional institutions such as village headmen, *Maiba* and *Maibi* (priests and priestesses or local medicine respectively), and local people, educated persons, etc. were consulted for identifying sacred plants used in rituals and religious practices and also their local medicinal uses. Data on these plants were collected through informal and formal interviews as well as observing the items included in traditional rituals performed.

Table 1. Sacred/taboo plants of *Meitei* community, their bioactive contents and traditional medicinal uses

Botanical name	Local name	Ritualistic uses	Medicinal uses/properties	Local traditional uses	Bioactive content
<i>Aegle marmelos</i>	Harikhagok	Used in Shiv puja	Diarrhoea, stomach problem, laxative, etc.	Laxative	Furocoumarines – marmelosin, tannins
<i>Artocarpus heterophyllus</i>	Theibong	Used in rituals	Antidiabetic, stomach ulcer, constipation, antioxidant, inflammation, nervous system, laxative, diuretic, snake bite etc.	Stomach ulcer, constipation	Trypsin inhibitor, thiamine, niacin,
<i>Butea monosperma</i>	Kurao angouba	Used in rituals. Barks which are taken on Saturday are used in making talisman by local priest (<i>naiba</i> and <i>maibis</i>) for protection against ghost and evil spirit	Diarrhoea, dysentery, ringworms, for killing maggots in wounds – sores, leucorrhoea, diabetes, etc.		Alkaloid: monospermin; Kino-tannic acid and gallic acid; pyrocatechin; glucoside;
<i>Calotropis gigantea</i>	Angot	Used in rituals	Aphrodisiac, piles, aches, skin, dropsy, anthelmintic, tooth-gum ache, paralysis, anesthesia, toxic asthma, elephantiasis, syphilis	Tooth-gum ache	Alkaloid: Akundarin, calotropin; α -amyrin, β -amyrin, taraxasterol, β -sitosterol and <i>l</i> -taraxasterol
<i>Cynodon dactylon</i>	Tingthou	Used in rituals	Vomiting, catarrhal, cuts and wounds, dropsy, diarrhoea, dysentery, vesical calculus, secondary, syphilis, piles, urinary problems, antidiabetic, anti-inflammatory, etc.	Stomach ache, eye ache	Sitosterol, β -carotene, vitamin C, palmitic acid, triterpenoids, arundoin, friedelin, selenium, alkaloids – ergonovine and ergonovinine, ferulic, syringic, <i>p</i> -coumaric, vanilic, <i>p</i> -hydroxybenzoic and <i>o</i> -hydroxyphenyl acetic acids, cyanogenic hyperoside, cyanogenic glucoside
<i>Dactyloctenium aegyptium</i>	Pungphai	Used in rituals	Astringent, bitter tonic, polyurea anthelmintic, wounds and ulcers	Fever	Oxalic acid, oxalates, glutamic and aspartic acids, cystine and tyrosine, cyanogenic glycosides, saponins and carbohydrates
<i>Eupatorium birmanicum</i>	Langthrei	Used in rituals	Burning sensation, leucorrhoea, stomach ulcers, antibacterial, etc.	Reduce burning sensation of stomach from eating chilli	Coumarin, β -sitosterol, β -sitosterol-D-glucoside, <i>o</i> -coumaric acid, cerebroside 1, ceramide 2, and quercetin-3- <i>o</i> -rutinoside 3
<i>Ficus religiosa</i>	Sanakhongang	A scared tree and associated with Gautam Buddha. The <i>Meitei</i> community believes that the souls of the forefathers reside in the top of the tree and the cutting down of it is considered as a taboo.	Antibacterial, antiprotozoal, antiviral, astringent, antidiarrhoeal, in the treatment of gonorrhoea, ulcers, and the leaves used for skin diseases, laxative, tonic, asthma, anti-inflammatory	Bark decoction used for diarrhoea and diabetes	Phenols, tannins, steroids, alkaloids and flavonoids, β -sitosterol-D-glucoside, methyl oleanolate, lanosterol, stigmasterol, lupen-3-one; β -sitosterol-D-glucoside; isoleucine, and phenylalanine; phytosterolin, β -sitosterol, albuminoids, matter, caoutchouc; flavonols – kaempeferol, quercetin, and myricetin

(Contd)

Table 1. (Contd)

Botanical name	Local name	Ritualistic uses	Medicinal uses/properties	Local traditional uses	Bioactive content
<i>Mangifera indica</i>	Heinou	Used in rituals. Leaves are used in marriage ceremony and leaves garland are used in the door of the foundation ceremony of newly constructed house.	Antidiabetic, anti-oxidant, anti-viral, cardio tonic, hypotensive, anti-inflammatory properties, dentritic, antiseptic, astringent, diaphoretic, stomachic, vermifuge, tonic, laxative and diuretic and to treat diarrhoea, dysentery, anaemia, asthma, bronchitis, cough, hypertension, insomnia, rheumatism, toothache, leucorrhoea, haemorrhage and piles. Diabetes, tonic, gastric disorders, constipation	Laxative, gastric problems; bark decoction used for diarrhoea and diabetes	Polyphenolics, flavonoids, triterpenoids. Mangiferin, a xanthone glycoside, is major bio-active constituent, isomangiferin, tannins and gallic acid derivatives. protocatechic acid, catechin, mangiferin, alanine, glycine, γ -aminobutyric acid, kinic acid, shikimic acid and the tetracyclic triterpenoids cycloart-24-en-3 β :26diol, 3-ketodamm-24 (<i>E</i>)-en-20S,26-diol, C-24 epimers of cycloart-25 en 3 β :24,27-triol and cycloartan-3 β :24,27-triol (E)-3-hydroxymegastigm-7-en-9-one, (3S,5R,6S,7E)-megastigma-7-en-3,5,6,9-tetrol, dendranthemoside B, icaraside B2, sedumoside F1, luteolin, quercetin 3- <i>O</i> - β -D-glucuronide, quercetin 3- <i>O</i> - β -D-glucoside, isorhamnetin 3- <i>O</i> -rutinoside, aliphatic acid, maslinic acid, and <i>N</i> -methylasimilobine; Norsesquiterpenoids and triterpenes
<i>Nelumbo nucifera</i>	Thambal	Related with gods – Vishnu and Lakshmi. Considered as sacred holy plant. <i>Meitei</i> community believes that any unhygienic practices on this plant lead to scab disease	Diuretic, dizziness, stomachic	Diuretic, dizziness, stomachic	Glucosides, nupharine and nymphaeine, flavone glucoside, myricitrin, tannic acid, phytosterin, steroids and flavonoids; cardiac glycoside-nymphalin
<i>Nymphaea nouchali</i>	Esing tharo	Used in ritual	The powdered rhizome is given in dyspepsia, diarrhoea and piles. Rhizome and stem are considered emollient and diuretic.	The blooms are in great demand for religious festivals and offering to the gods.	Linoleic acid, linolenic acid, oleic acid, palmitic acid, stearic acid; essential oil-aromadendrene oxide, benzaldehyde, borneol, bornyl acetate, camphor, caryophyllene oxide, cis-terpineol, cubenol, cardimene, D-limonene, eucalyptol, eugenol, heptanol, humulene, limonene, <i>n</i> -butylbenzoate, ocimene, oleic acid, sabinene, selinene, phytol, veridiforo, methyl chavicol, linalool. Aesculetin, aesculin, apgenin, etc.
<i>Nymphaea stellata</i>					
<i>Ocimum sanctum</i>	Tulsi	Incarnation of Brinda. Water mixed with its leaves is used to spray over the body after the funeral death ceremony to remove evil from the body. Every household of <i>Meitei</i> community has one plant in the courtyard to worship the god in the morning and in the evening.	Epectorant, menstrual disorder, cough and fever, antimicrobial, bronchitis, bronchial asthma, malaria, diarrhoea, dysentery, skin diseases, arthritis, painful eye diseases, chronic fever, insect bite, etc.	Epectorant, cough, antimicrobial, antiseptic	

(Contd)

Table 1. (Contd)

Botanical name	Local name	Ritualistic uses	Medicinal uses/properties	Local traditional uses	Bioactive content
<i>Oroxylum indicum</i>	Shamba	Associated with <i>Meitei</i> legend	Diarrhoea, fever, immunostimulant antiinflammatory, antiarthritic anticancer, hepatoprotective, antioxidant, photocytotoxic, antiproliferative, antimicrobial, antimutagenic, antiulcer	Treating cancer, scabies, mouth ulcer, gastric problems	Baicalein-7- <i>O</i> -diglucoside (Oroxylin B), baicalcin-7- <i>O</i> -glucoside, chrysin, apegenin, prunetin, sitosterol, oroxindin, biochanin-A, ellagic acid, baicalcin and its 6- and 7-glucuronides, scutellarein, tetuin, antraquinone and aloë-emodin. Diterpenoids, monoterpene, sesquiterpenes
<i>Plectranthus ternifolius</i>	Khoiju	Repels evil spirits. Every household of <i>Meitei</i> community smoked the households and surrounding area during 'Lamta thangja' every Saturday of May	Antiseptic, stimulant and for treating skin diseases	Antifungicide, disinfectant	
<i>Phlogacanthus thyrsofloris</i>	Nongmang-kha	Medicinal uses	Coughs, colds, asthma, antidote to pox, prevents skin diseases like sore, scabies, jaundice, etc.	Cold and cough	Diterpenoid and terpenoids, β -sitosterol, lupeol and betulin; diterpene glucoside, phloganthoside
<i>Syzygium jambos</i>	Gulapjat	believed to be the incarnation of deity, Soraren	Tonic for the brain and liver and as a diuretic, fever, diarrhoea, dysentery and catarrh, anesthetic, antihypertensive agents, diuretic, an expectorant in the treatment of rheumatism; to treat sore eyes; and as a febrifuge, asthma, bronchitis, epilepsy, etc.	Antipyretic and anti-inflammatory	Tannins, saponins, alkaloid, jambosine, tannins, oleoresin, Ocimene, α -pinene, camphene, cadinene, borneol and α -terpineol
<i>Terminalia arjuna</i>	Mayokpha	Believed to be the incarnation of <i>Ebudhou Pakhangba</i> , a deity of the <i>Meitei</i> community	Anti-oxidant, heart disease, asthma, dysentery, etc.	Bark is used in treating diabetes	Tannins, arjunglucosides, phytosterols
<i>Toona ciliata</i>	Tairen	Used in rituals and to repel evil from the household by local veds – <i>Maiba</i> and <i>Maibis</i> . Leaves are used to cleanse the house after the birth of new child	Emmenagogue, menstrual disorders, astringent, tonic, expectorant, anthelmintic, apurodisiac, antiperiodic, chronic, dysentery, ulcer, leprosy, cures fever, headache, blood complaints, cardiotoxic	Chronic dysentery, ulcer, leprosy, fever, headache, expectorant.	Cedrelone, sesquiterpene, cycloartene stigmasterol, campesterol, apotirucallene, tirucallene, catechin, proanthocyanidin, leucoanthocyanidin, toonacinin, 6-acetoxytoonacinin, toonacilid, geranyl geraniol, δ -cadinene, calamenene, α -calacorene, siderin, deoxycedrelone, Cedrelone, 5-methylcoumarins, limonoids, toonafofin
<i>Zanthoxylum acanthopodium</i>	Mukthrubu	Medicinal uses	Digestive, antipyretic, expectorant, dyspepsia, bronchitis	Expectorant, mouth ulcer	Terpenoid; β -linalool, bergamot mint oil, α -limonene diepoxide, α -pinene, β -Myrcene and D-limonene

Meiteis have a tradition of growing ritualistic plants around their houses or preserve them in sacred groves. They protect them based on indigenous cultural and religious beliefs and taboos. The people in the community are advised and taught right from childhood that deities or evil spirit reside on these plants/trees and they should not be cut. Urination, disposal of garbage and dirty items are not permitted in the vicinity of these plants, as it is believed that it will anger the deity or brings bad omen to the family or to the person. These plants are exclusively used in rituals and worship and are strictly guarded. Plucking of flowers, fruits and cutting of plant parts are strictly prohibited, especially on certain days of the week and during night time. There is a strong bond between the people and the sacred plants and they are sometimes regarded as a local deity.

A study of these sacred plants revealed that these plants have one or more great healing powers and the local people use it for many medicinal purposes time and again. Most of the sacred plants have many important medicinal properties and uses; and the people are using it for curing many day-to-day ailments⁸⁻²⁴. *Phlogacanthus thyrsoifloris* is used for treating cold and cough. The leaf decoction is taken orally and used for bathing in times of ailment. Even the leaves are kept under pillow and blanket for quick recovery from cold and cough. Leaves of *Eupatorium birmanicum* are chewed to reduce the effect of burning sensation of chilli in the mouth and bowel. Table 1 lists sacred plants along with their medicinal properties, traditional uses and chemical constituents. The sacred plants are either mentioned in religious books or are related with religious incidence in the past because of which they are sacred to these people. It may be hypothesized that, in the past these sacred plants might have been incorporated with some social taboos by the ancestors to conserve them from destruction or over exploitation. Ancestors might have thought that these instant sources of medicines with healing powers need to be conserved for posterity so that they are always available to the community whenever needed. They are mostly grown around the houses so that they are easily available in times of need. Restrictions and taboos associated

with these plants are justified on the ground that most of the medicinal plants are either consumed directly or as decoction. Practice of plucking or cutting only on specific days and prohibition of cutting during night times may be a form of conservation of these plants from over exploitation and destruction. Local people also follow ancestral worship and animism in the form of deity worship, with the central focus on worship in forest patches. These beliefs and taboos associated with the Sylvan deities (Umanglais) in the forest patches do not permit any sort of disturbance to flora and fauna. Such social taboos help conserve the organism as a whole in the sacred groves²⁵.

The traditional beliefs and taboos associated with sacred plants contribute to some extent to conservation of biodiversity from the ever increasing urbanization. The local people try to conserve these plants with their traditional beliefs. Due to such beliefs and taboos, many of the medicinally important plants are preserved and are seen grown in the vicinity of houses escaping the force of urbanization. Even at this time of modern medicine, these medicinal plants are popular amongst local people as herbal medicine. Documentation of these sacred plants along with traditional medicinal uses is needed for posterity, conservation and sustainability.

1. Anon.; <http://ecoheritage.cpreec.org>
2. Vedaja, S., *Manipur Geography and Regional Development*, Rajesh Publications, New Delhi, 1998, p. 167.
3. Pal, D. C. and Jain, S. K., *Tribal Medicine*, Naya Prakash, Calcutta, 1998.
4. Pakrashi, S. C. and Mukhopadhyay, S., *Medicinal and Aromatic Plants of West Bengal – Midnapore, Kolkata*, W. B. Academy of Sciences and Technology and Department of Science and Technology and NES, 2001.
5. Bhakat, R. K. and Pandit, P. K., *Indian For.*, 2003, **129**, 224–232.
6. Bhakat, R. K. and Pandit, P. K., *Indian For.*, 2004, **130**, 37–43.
7. Paria, N., *Medicinal Plant Resources of South West Bengal, Kolkata*, Directorate of Forests, Govt of West Bengal, 2005.
8. Devi, L. R., Singh, T. S. and Laitonjam, W. S., *Indian J. Chem.*, 2007, **46B**, 1868–1872.
9. Das, M. C., Shama, S. and Satish, C., *J. Drug Del. Therap.*, 2013, **3**, 117–120.

10. Asthana, A., Kumar, A., Gangwar, S. and Dora, S., *Res. J. Pharmaceut., Biol. Chem. Sci.*, 2012, **3**, 1135.
11. Ghani, A., *Medicinal Plants of Bangladesh with Chemical Constituents and Uses*, Asiatic Society of Bangladesh, Dhaka, 2003, 2nd edn, p. 184.
12. <http://www.mpbd.info/plants/dactyloctenium-aegyptium.php>
13. Sheetal, A., Bagul, M. S., Prabia, M. and Rajani, M., *Indian J. Pharm. Sci.*, 2008, **70**, 31–38.
14. Oliver, B. B., *J. Ethnopharmacol.*, 1977, **2**, 119–127.
15. Khare, C. P., *Encyclopedia of Indian Medicinal Plants*, Springer-Verlag, Berlin, 2004, pp. 50–58.
16. Scartezini, P. and Speroni, E., *J. Ethnopharmacol.*, 2000, **71**, 23–43.
17. Prakash, P. and Gupta, N., *Indian J. Physiol. Pharmacol.*, 2005, **49**, 125–131.
18. Kadian, R. and Parle, M., *Int. J. Pharm. Life Sci.*, 2012, **3**, 1858–1867.
19. Devi, R. K. B. and Sarma, H. N. K., *J. Appl. Phys.*, 2013, **4**, 47–51.
20. Lukhoba, C. W., Simmonds, M. S. J. and Paton, A. J., *J. Ethnopharmacol.*, 2006, **103**, 1–24.
21. Djipa, C. D., Delme, M. and Quetin-Leclercq, J., *J. Ethnopharmacol.*, 2000, **71**, 307–313.
22. Harminder, S. V. and Chaudhary, A. K., *Indian J. Pharm. Sci.*, 2011, **73**, 483–490.
23. Phurailatpam, A. K., Singh, S. R., Chanu, T. M. and Ngangbam, P., *Afr. J. Agric. Res.*, 2014, **9**, 2068–2072.
24. Rana, V. S. and Blazquez, M. A., *J. Essential Oil*, 2008, **20**, 515–516.
25. Khumbongmayum, A. D., Khan, M. L. and Tripathi, R. S., *Biodivers. Conserv.*, 2005, **14**, 1541–1582.

ACKNOWLEDGEMENT. We thank the *Meitei* community of Manipur for co-operation during documentation of the sacred plants.

Received 29 November 2014; re-revised accepted 6 May 2015

A. K. PHURAILATPAM¹
S. R. SINGH¹
R. NONGTHOMBAM^{2,*}

¹College of Horticulture and Forestry,
Central Agricultural University,
Pasighat 791 001, India

²Indian Council of Agricultural Research,
Bashar 791 101, India

*For correspondence.
e-mail: romensenjam@yahoo.com