Int.J.Curr.Microbiol.App.Sci (2017) *6*(10): 3266-3274

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 6 Number 10 (2017) pp. 3266-3274**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2017.610.383

Harnessing the Indigenous Knowledge Base Associated with Horticultural Enterprise for Sustainable Development of North Eastern State, Manipur, India

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Keywords

Horticultural enterprise, Indigenous knowledge, North eastern state, Participatory methodology, Sleeping giant, Sustainable development.

Article Info

Accepted:
26 September 2017
Available Online:
10 October 2017

A B S T R A C T

In the present scenario, North Eastern States, sleeping giants are the store house of indigenous knowledge base which may be utilized for second green revolution towards sustainable development of the rural areas without hampering the ecological pursuits of the region. The enriched biodiversity and other indigenous knowledge base are still unexplored and not known to others. The horticulture enterprise is one of the important vocations of the north eastern hill region people and their management practices are ancient, indigenous and traditional in nature. Consequently, the need of the hour is to explore the indigenous knowledge base associated with the horticultural enterprise in the north eastern region for assessing the scientific rational of the same and creating a new blend of technology mix for sustainable development of the horticultural enterprise. Keeping the above consideration in view, the present study is conducted to harness the indigenous knowledge base associated with the horticultural enterprise in Manipur state. The participatory methodology was followed to construct and conduct the whole research study. The key informant methods and focus group discussion methods were followed to collect the information. The collected information reflected that certain plants are used traditionally in combination with other plants for extraction and preparation of dyes utilizing indigenous processes. The people also have a tradition of conserving wild orchids in nature based on various religious beliefs and herbal healthcare. It is an important factor for sustainability of natural genetic resource management. Certain plants are used by the ethnic people of Manipur to forecast weather, to predict natural calamities and as taboos to avoid negative occurrences. These traditional knowledge systems are taken care and also preserve these plants as an important resource. Thus ample number of indigenous knowledge is available in this region which would be refocused in near future.

Introduction

All aspects of human culture are rich with references and meanings regarding plants since they have different cultural background and symbolic meanings which still greatly influences modern plants preferences and uses in our life. Manipur is one of biodiversity rich states of the seven sister states of North eastern region having a total geographic area of 22,327 sq.km. (Longitude-93.20E-94.47E and latitude 23.50N-25.41N). As we move into the decades of environment, it is obvious that the garden plays an important role in

environmental improvement. However, the value of the garden in our spiritual civilization will be paid more attention too, because the garden is an art to express the highest truths of religion, philosophy and has been used as a haven for reflection by philosopher and as a source of inspiration and a symbol of virtue/vice by artists and poets. Plants and nature are woven into the unconscious mind of human and served as a source of spiritual renewals. In order to satisfy the unlimited want of humanity, optimal utilization of the scarcity of resources to increase human welfare in a sustainable development is the challenges the entire world faces today. North-eastern region of India is the traditional home of near about 876 orchid species belonging to 151 genera of which many species are economically important for their ornamental and medicinal values. The people of this region have a tradition of conserving wild orchids in nature, based on various religious beliefs and culture. Keeping the above consideration in view, the present study is conducted to harness the indigenous knowledge base associated with the horticultural enterprise in Manipur state.

Materials and Methods

The multistage random sampling procedure and the participatory methodology were followed to construct and conduct the whole research study. 60 respondents were selected purposively. The key informant methods and focus group discussion methods were followed to collect the information. The information was also collected through personal interview method and documented for drawing conclusion. Use Intensity Index on any ITK was also calculated in this study to analyse utilization pattern (Table 2).

$$UII = \frac{\text{Total usage score obtained by ITK}}{\text{Maximum usage score obtainable by the ITK}} \times 100$$

Results and Discussion

Majority of the farmers were in middle-age category (70%). Most of the farmers had medium level of education (63.33%). Majority of respondents were under medium level of education. Agriculture was the sole occupation of 25 percent farmers whereas others had subsidiary occupations. Most of the respondents were medium farmers (66.66%). Majority of the respondents were having medium size of land holding. Majority of the farmers Most of the farmers had medium levels of annual income (55%) and material possession (60%) (Table 1).

Plants associated in forecasting and beliefs within the community of Manipur

Certain plants have been used by the ethnic people of Manipur to forecast weather, to predict natural calamities and as taboos to avoid negative occurrences.

Agave americana Linn. (Agavaceae)/ Agave plant or century plant Kewa (Manipur), Sisal (Hindi) – T1

The flowering pattern of this plant is used to predict the direction of the winds and storms in a given year. This storm or wind is expected to blow from the opposite direction from where the greatest number of flowers is positioned in an inflorescence.

Alocasia indica Schott. (Araceae)/ Alocasia or Elephant ear plant Yendem (Manipuri) – T2

This plant seldom produces flowers in home gardens. If it does, it is assume that the family that cultivate this plant may face certain difficulties and that the prosperity of the family will be ruined. If the flowering is noticed, the entire plant is removed immediately from the garden.

Bambusa Spp. (Poaceae)/ Bamboo Waa (Manipuri), Bans (Hindi) – T3

If the bamboo bears flowers, it is predicted that there will be famine in the coming years. When there is bamboo flowering, the numbers of rodent increase thereby damaging the crops. If the apex crown (shoot) is cultivated on private land is is domed shaped, it is assumed that one member of the family may die shortly because bamboos in this shapes are used in funeral ceremonies.

If this is noticed the bamboo is cut immediately. Cutting down bamboos on Tuesdays and Saturdays is prohibited. It is believed that bamboo colony nay die shortly and prosperity of the family may decline.

Brassica campestris Linn. (Brassicaceae)/ Mustard plant or Turnip plant Hangam (Manipuri), Sarson (Hindi) – T4

Tradionally, a handful of mustard seeds are immediately sown on the funeral site of the dead person. If the seeds sprout and grow into seedlings, it is believe that the dead person may be reborn as another creature.

This is practice as an indicator of how much the deceased person contributed for betterment of the society when he is alive.

Ficus rumphii Blume. (Moraceae)/ Rumphf's fig tree Khongnang (Manipuri), Paras Papal (Hindi) – T5

It is believed that when the branch of this tree falls down the person in the direction of the branch which has fallen may die. If crows construct their nest on top branch, it is assumed that flood may occur in that particular year and that there will be fewer winds and windstorms whereas of the nest is made on the lower branches of the tree, there may be strong winds in that year.

Hibiscus cannabinus Linn. (Malvaceae)/ Deccan hemp Sougri (manipuri) – T6

If the plant bears a number of flowers, it is presumed the rainfall of the year will be good. The ending of rainfall of the particular year is determined by the end of flowering of this plant. If the plant stops producing flowers the leaves are tinged with violet colour it is that rainfall of the current year has finished.

Mangifera indica Linn. (Anacardiaceae)/ Mango Heinou (Manipuri), Aam (Hindi) – T7

If the mango tree produces large number of flowers the current year may have more wind and storms and heavier rainfall.

It is also assumed that if the colour of the mango leaves is dark green at the beginning of the season, there will be good rainfall.

Platycerium wallichi Hook. (Polypodiaceae) Staghorn fern Saji- machi changkhrang (Manipuri) – T8

This plant is very rare epiphytic fern from Manipur for the first time in India.

If the vegetative part of the staghorn fern is dark green it is indicator of imminent rainfall. And if the colour is dull, no rainfall is expected in the immediate future.

Quercus serrata Thunb. (Fagaceae)/ Tasar oak tree Uyung (Manipuri) – T9

The wood/ timber is not used in house construction. As narrated by knowledgeable person this tree is frequently hit by lightning and houses constructed with this wood might heat by lightning.

Terminalia tomentosa (Roxb) Weight and Arn (Combrataceae)/ Indian Laurel, Mayokpha (Manipuri), Sadar/ Madar (Hindi) – T10

The bark of this tree is used by local healers to treat heart disease.

The fresh tree bark soaked in water overnight is given to patients for heart related problems mainly weak hearts. However, any bark collected without formal request to the tree is not used for the treatment.

Therefore, before collecting the bark from a leaving tree, one visit the tree one day ahead of collection, make it an offering of beetle nuts and leaves, request permission to collect some barks.

Natural dye yielding plants and indigenous knowledge of dyeing

These plants are used traditionally in combination with other plants for extraction and preparation of dyes utilizing indigenous processes.

Acacia catechu Wild (Mimosaceae)/ Kabokhajee (local name) – T11 A fast reddish black dye

Achyranthus aspera Linn. (Amaranthaceae)/ Khujumpere (local name) – T12 Adhesive for various colours and making colours brighter

Amoora spectabilis Miq. (Meliaceae)/ Ungang (local name) – T13 A pale scarlet colour

Basella alba Linn. (Basellaceae)/ Urok sambal (local name) – T14 A deep purple dye, different colours obtained from leaves and stems and is used for dyeing fabrics and painting (Fig. 1).

Table.1 Socio economic Profile of Farmers

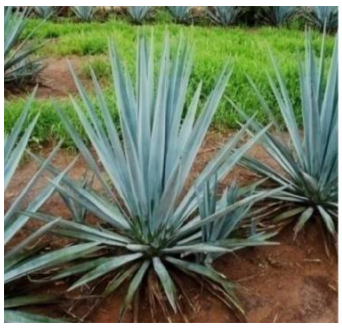
N= 60

Sl.no	Variable	Category	Frequency	Percentage
1	Age	Young	8	13.33
		Middle	42	70.00
		Old	10	16.67
2	Education	Low	13	12.67
		Middle	38	63.33
		High	9	15.00
3	Occupation	Agriculture	15	25.00
		Agriculture & others	45	75.00
4	Land holding	Small	10	16.67
		Medium	40	66.66
		Large	10	16.67
5	Income	Low	12	20.00
		Medium	33	55.00
		High	15	25.00

Table.2 Use Intensity Index of ITKs

T1	11.67	T9	18.33	T17	70.83	T25	54.2
T2	33.33	T10	75	T18	78.33	T26	19.16
T3	91.67	T11	21.67	T19	26.66	T27	23.33
T4	100	T12	19.16	T20	58.3	T28	41.66
T5	15	T13	T13	T21	35	T29	60
T6	98.83	T14	T14	T22	32.50	T30	62.5
T7	12.5	T15	23.33	T23	50	T31	64.17
T8	83.33	T16	43.33	T24	28.33		

Fig.1 Plants associated with weather forecast and dyeing agent

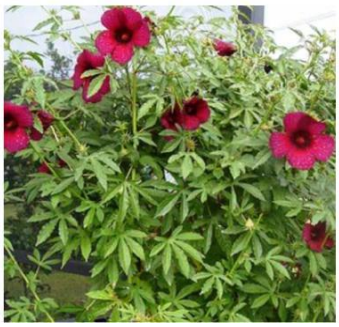


Agave americana

Alocasia indica

Bambusa Spp

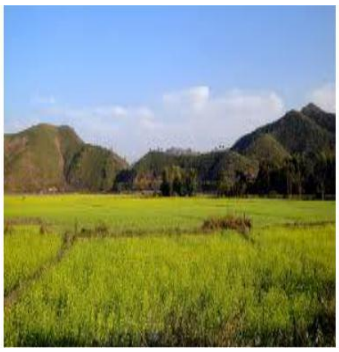
Mangifera indica



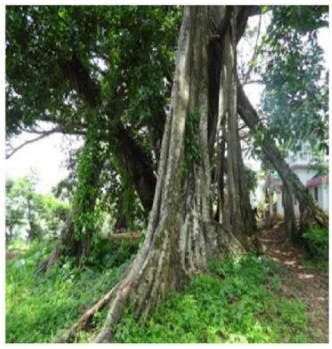
Hibiscus cannabinus

Platycerium wallichi

Quercus serrata



Brassica campestris



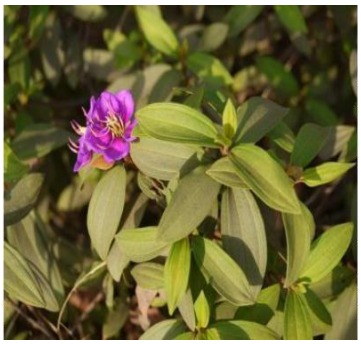
Ficus rumphii

Terminalia tomentosa

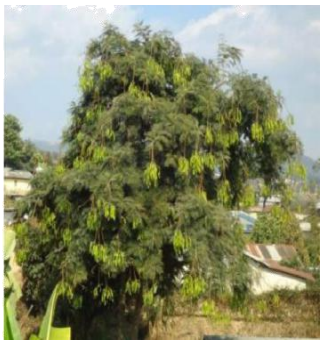
Basella alba

Celosia argentea

Clitoria ternatia

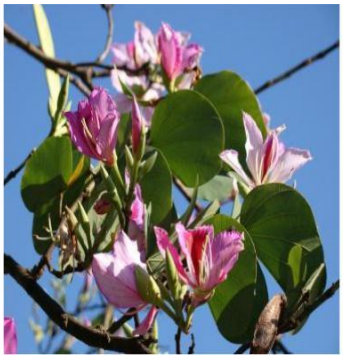


Melastoma malabathricum



Parkia roxburgii

Tectona grandis



Bauhania purparea

Berberis manipurana

Bixa orellana

Achyranthus aspera

Acacia catechu

Carthamus tinctorius

Emblica officinalis

Iris bakeri

Fig.2 Orchids and its natural habitat

Ascocentrum ampullaceum

Paphiodelum spicerianum

Vanda amesiana

Vanda stageana

Rhyncostylis retusa

Dendrobium transparens

Sacred groves

Sacred groves

Celosia argentea Linn. (Amaranthaceae)/ Haorei angangba (local name) – T15

Clerodendrum odoratum D. Don (Verbanaceae) Kuthap (local name) – T16 A pale green dye is obtained from the leaves.

Clitoria ternatia Linn. (Papilionaceae)/ Aparajita (local name) T17 A blue dye is obtained from flowers

Melanorrhoea usitata Wall. (Anarcadiaceae)/ Khe-U (local name) – T18 An oily blackish dye obtained from woods and roots.

Melastoma malabathricum Linn. (Melastomataceae)/ Yachubi (local name) – T19 A dark blackish red

P. roxburgii G. Don (Mimosaceae)/ Yongchak (local name) – T20 A deep chocolate dye

Stribilanthes flaccidifolius Nees. Syn. S. cusia Nees Imly (Acanthaceae)/ Kum (local name) – T21 Indigo colour and black

Tectona grandis Linn. f. (Verbenaceae)/ Chingshu (local name) – T22 Red for dyeing

silk. *Bauhania purparea* Linn. (Ceasalpiniaceae)/ Chingthrao angangba (local name) – T23 A rose purple dye from fresh flower

Berberis manipurana Ahr. (Berberidaceae)/ U-napu (local nmae) – T24 A beautiful yellow dye from stem and roots

Bixa orellana Linn. (Bixaceae)/ Ureirom (local name) – T25 A pale red dye obtained from seeds

Carthamus tinctorius Linn. (Asteraceae)/ Kusumlei (local name) – T26 A golden yellow dye from flowers

Curcuma domestica (Zingerberaceae)/ Yaingang (local name) – T27 A yellow dye obtained from rizhomes

Emblica officinalis Gaertn. (Euphorbiaceae)/ Heikru (local name) – T28 A black dye from fruits and barks

Iris bakeri Wall. (Iridaceae)/ Kombirei (local name) – T29 A blue colour obtained from flowers

Pasania pachyphylla (Kurz.) Schottky (Fagaceae)/ Kuhi (local name) – T30 Reddish brown to brown obtained from bark

Solanum Indicum Linn. (Solanaceae)/ Khamu (local name) – T31 Purple dye prepared from dye

The people of the state have been using indigenous dye stuffs from plants since time immemorial, in handicrafts, handlooms, fine arts etc. Though the history of the state witnesses the intensive used of natural dyes since ancient times, documented systematic investigations are few. The people of Manipur can produce these dyes in large scales, commercially by opening factories and can compete with chemical dyes which are harmful to environmental point of view. It also serves as source of socio-environmental development of the people in Manipur in particular and for the nation in general.

Traditional knowledge on conservation of wild orchids

The people have a tradition of conserving wild orchids in nature based on various religious beliefs and herbal healthcare. It is an important factor for sustainability of natural genetic resource management. Manipur is also rich in orchid diversity and occupies fourth position in orchid diversity. Out of 251 orchids found in the state four species *Ascocentrum ampullaceum, Paphiodelum spicerianum, Vanda amesiana and Vanda stageana* are endemic to the state. The people conserve orchids in their natural habitats in sacred groves. Sacred groves are the forest patches rich in biodiversity and play an important role in conservation by the local communities in sustainable manner with their socio- cultural and religious practices. Dedicating a patch of forest land to deities is the common practice for the Meitei community which assumes great significance in conservation of natural diversity. According to the belief, the sacred groves are the property of Gods and not to allow anyone to damage which help to conserve the orchids in their natural habitat. Therefore, there is urgent need to protect the valuable orchid species in their natural habitats as orchids are very sensitive to ecological disturbances. Understanding the traditional knowledge of conserving the orchids of the local people will be helpful for sustainable orchid resource management of this region (Fig. 2).

As local communities practice this traditional knowledge systems; they take care and preserve plants as an important resource. The people can also produce dyes in large scales,

commercially by opening factories and can compete with chemical dyes which are harmful to environmental point of view. It also serves as source of socio-environmental development of the people. There should be a blend between scientific knowledge and indigenous knowledge so that a strategy can be prepared for the second green revolution in the sleeping giant area.

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How to cite this article:

Amita Hanglem, Rocky Thokchom, Sanasam Sanjay Singh and Jenita Thokchom. 2017. Harnessing the Indigenous Knowledge Base Associated with Horticultural Enterprise for Sustainable Development of North Eastern State, Manipur, India. *Int.J.Curr.Microbiol.App.Sci.* 6(10): 3266-3274. doi: https://doi.org/10.20546/ijcmas.2017.610.383