Explor Anim Med Res.
Vol. 13, Ethnomed. Spl., 2023
DOI : 10.52635/eamr/13(S)102-108

ISSN 2277-470X (Print), ISSN 2319-247X (Online)
Website: www.animalmedicalresearch.org

Research Article

QUANTITATIVE ETHNOBOTANY OF SOME *FICUS* L. SPECIES IN KHASI AND JAINTIA HILLS, MEGHALAYA, INDIA

Sreyoshee Sensarma[1]*, Chaya Deori[2], Uma Shankar[3]

Received 29 November 2022, revised 21 July 2023

ABSTRACT: *Ficus* L. is a genus in Moraceae with 115 taxa from all over India and plays a key role in Indian ethnobotany. The Khasi and Jaintia hill in Meghalaya is rich in flora including the genus *Ficus* L. and have diverse cultures among local tribes. The uses, coverage, and cultural importance of *Ficus* can be expressed through several quantitative ethnobiological indices such as TIV, RFC, CI, and UV. This paper highlights the indices for ten species of *Ficus* used by the tribal people in the Khasi and Jaintia hills of Meghalaya which shows that the genus has higher ethnobotanical value.

Key words: Herbal, Khasi, Jaintia, Ethnobotany, Indices, Moraceae.

INTRODUCTION

Plant resources are one of the main sources of daily needs of human life. People use various plant parts as medicine from ancient days and validation of the reported efficacies of the plants targeting their effective use in mankind is a continuous process (Pattanayak 2021, Patel *et al.* 2022, Paul and Sujatha 2022).

Different hilly communities in the northeastern part of India use medicinal plants to cure their ailments and complete documentation of their knowledge is important (Pradhan *et al.* 2021). Meghalaya is one of the states of Northeast India covering an area of 22,429 km^2. The state comprises 11 districts: East Khasi Hills, West Khasi Hills, South West Khasi Hills, East Garo Hills, West Garo Hills, North Garo Hills, South Garo Hills, South West Garo Hills, East Jaintia Hills, West Jaintia Hills, Ri-Bhoi. The climatic condition of Meghalaya being favorable has resulted in the rich diversity of species in the Moraceae family, especially in the genus *Ficus* L.

The local communities of Meghalaya are Garo, Khasi, and Jaintia tribes. These three tribes are much different from each other in language, folklore, belief, traditions, cultural heritage, and rich plant lore that gives a researcher huge scope for ethnobotanical studies (Hazra 1981, Kharkongor and Joseph 1981).

The genus *Ficus* L. was first described by Linnaeus in 1753 in *Genera Plantarum* with only seven species. Roxburgh's (1832) *Flora Indica* included 55 species from India. King (1887-1888) recorded 113 species and 47 infra-specific taxa in a systematic account of the Indian *Ficus* L. from the whole of British India. Of these, 75 species and 16 infra-specific taxa were from present India. The genus *Ficus* L. comprises 750 species throughout the world (Corner 1958, 1965, 1969, 1975; Berg 1989, 2001, 2003 a,b,c,d,e, 2004 a,b; Berg and Corner 2005). The Asian species of *Ficus* L. were worked out by Corner (1965). In India, the genus *Ficus* L. comprises 115 taxa (Chaudhary *et al.* 2012). Recently, Shankar (2021) enlisted 65 taxa of *Ficus* L. from Northeast India.

The genus exhibits several growth forms like trees, shrubs, herbs, or climbers, often with milky latex. The plants have distinguishing characteristics like cauliflorous inflorescence with hypanthodia and minute unisexual and bisexual flowers. Khasi and Jaintia tribes use mostly the leaves, roots, latex, and young or mature fruits of *Ficus* species.

[1,2]*Botanical Survey of India, Eastern Regional Centre, Shillong 793 003, India.*
[3]*Department of Botany, North-Eastern Hill University, Shillong 793 022, India.*
**Correspondence author. e-mail: sreyosheesen400@gmail.com*

Based on informant consensus, this study is used to estimate the cultural relevance of *Ficus* L. The typical quantitative ethnobotany indices are perhaps too limited as a tool for assessing important human-environmental interactions. Nonetheless, they may be a good starting point for learning about some elements of human communities and how they interact with the environment.

STUDY AREA

The present quantitative ethnobotanical study was carried out among Khasi and Jaintia tribes in Meghalaya at regular intervals from 2019 to 2022. The ethnobotanical information of different species of *Ficus* was documented from East Khasi Hills, West Khasi Hills, South West Khasi Hills, East Jaintia Hills, West Jaintia Hills, and Ri-Bhoi districts (Fig. 1). The local names of the species of *Ficus* L. were recorded carefully.

The voucher specimens were collected during the flowering and fruiting period and identified and deposited in the Assam herbarium of the Botanical Survey of India, Eastern Regional Centre, Shillong. The nomenclature follows Hooker (1888), Berg and Corner (2005), King (1887), along with Kanjilal *et al.* (1940). Fig. 3 shows the different *Ficus* spp. which are collected during the survey.

MATERIALS AND METHODS

The usage, benefits, and coverage expressed in different indices give us an idea about the local importance of 10 species of *Ficus* L. Higher values of UV, TIV, CV, FC, and TIV indicate that the particular species is highly used by the local tribes. The uses, coverage, and importance of *Ficus* L. can be expressed through several indices such as the Total Importance Index (TIV), Relative Frequency of Citation (RFC), Cultural Importance Index (CI), and Use Value (UV). The total Importance Index (TIV) is several ways a plant can be used in terms of percentage (Belal *et al.* 1998). The Relative Frequency of Citation (RFC) of the species was calculated using the Use Value (UV) which is a quantitative tool (Phillips *et al.* 1994). The Use Value (UV) is the number of uses mentioned by each informant and is the total number of informants of a tribe. Cultural Importance Index (CI) is a measure of relative importance per plant use (Faruque *et al.* 2018).

Data collection and analysis

The selection of informants is based on their rich knowledge of plants which are used by them for many generations.

A total of 67 informants or herb healers between 18 and 85 years were interviewed for extracting ethnobotanical information.

The Use Value (UV) was calculated by using the following formula (Phillips *et al.* 1994).

$UV = \Sigma U/N$

Where U = the number of plants cited by each informant for a given species and N = the total number of informants.

The index of relative frequency citation (RFC) was calculated according to Bano *et al.* (2013):

$RFC = FC/N$

This index shows the local importance of each species and it is given by the frequency of citation. Here, FC is the number of informants mentioning the use of the species and N is the total number of informants. RFC value is different in the case of different categories of usage.

The Cultural Index (CI) was calculated by using the formula given by Rawat and Kharwal (2021):

Where UR is the reported uses of a particular species, N is the total number of informants.

The Total Importance Value (TIV) was calculated from different types of uses of plants on the variation of importance.

RESULTS AND DISCUSSION

Table 1 shows the ethnobotanical data on ethnobotanical importance for 10 species of *Ficus* L. from the Khasi and Jaintia Hills of Meghalaya. The local names were recorded in Khasi, Jaintia, and Garo languages wherever possible.

The indices UV, FC, RFC, CI, and TIV, calculated based on 67 informants from Khasi and Jaintia tribes, are presented in Table 2. The UV value ranged from 0.014 to 0.19 whereas the CI value ranged from 0.044 to 0.179. The indices UV and CI were maximum for *F. elastica* and minimum for *F. curtipes* and *F. cyrtophylla*. So, *F. elastica* has higher usage and high cultural importance whereas *F. cyrtophylla* has minimum usage and minimum cultural value based on informants.

The CI value was fair for *F. hispida* and *F. racemosa*. The RFC was the highest for *F. auriculata* (0.149) and the lowest (0.007) for *F. hirta*, *F. curtipes* and *F. cyrtophylla*. The high RFC value for edible purposes indicates that the *Ficus* species are highly edible and can cure many ailments. RFC value is also high in *F. elastica* which is highly preferred as a means of transport by the Khasi and Jaintia tribes. The FC value ranged from 0.5 to 10 and it is high for *F. auriculata*

Table 1. Ethnobotanical importance for 10 species of *Ficus* L.

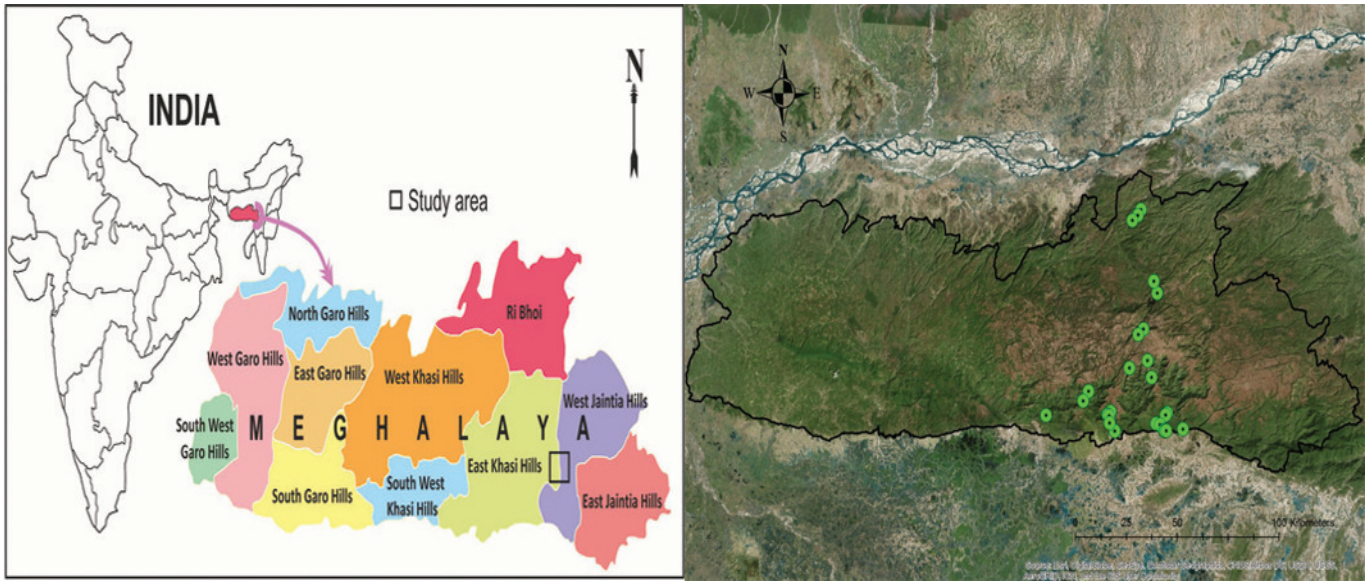
Scientific name	Common name	Ethnobotanical uses
Ficus auriculata Lour.	*Khasi:* Dieng-so-Shied, Dieng-soh-lampin; *Jaintia*: Sylchiat, Salapu, Ka jiri sim; *Garo*: The bol.	1. Ripe fruits are edible. Fruits are used in making jam. 2. Young leaves are cooked with pork meat. 3. Young shoots are cooked as vegetables in East Khasi Hills and Jaintia Hills.
Ficus benghalensis L.	*Khasi:* Dieng jri	1. Latex applied on cuts to stop instant bleeding and burning. 2. Leaf ash mixed with coconut oil, over burns. 3. Considered a sacred tree.
Ficus curtipes Corner	*Khasi:* Dieng-surisoh.	1. Used as an ornamental tree in many Khasi villages. 2. Fruits are used as fodder for cattle.
Ficus cyrtophylla (Miq.) Miq.	*Khasi:* Dieng jri	1. Ripe fruits are eaten by the Jaintia tribes. 2. It is used as a fuel wood.
Ficus elastica Roxb. ex Hornem.	*Khasi:* dieng-jri; *Garo:* Phrap-ramkhet.	1. The special features of hardiness and mechanical strength of the aerial roots of *Ficus elastica* have been well-known and utilized for centuries by the indigenous Khasi and Jaintia tribes in the subtropical moist broadleaf forest of East Khasi Hills and Jaintia Hills districts. 2. Commercially used for making rubber.
Ficus hirta Vahl.	*Jaintia:* Dieng-Sohla-pong, Punai; *Khasi:* Dieng-sohrompian	1. Mature fruits are edible. 2. Khasi tribes consider it a wound-healing plant.
Ficus hispida L.f.	*Assamese:* Khohota Dumoru; *Miri:* Takpi-asing; *Garo:* Panthap, Thiwek; *Khasi:* Dieng-lapong;	1. Ripe fruits are edible. 2. Jaintia tribes use young leaves and vegetables and cook with rice. 3. Leaf juice is very useful for the healing of eye itching.
Ficus pumila L.	*English:* Creeping Fig	Used as an ornamental plant in fences by many Khasi households.
Ficus racemosa L.	*Khasi:* Soh-jrism, Soh-fig-khlaw.	1. Young fruits are used as wild vegetables and boiled with meat. Ripe fruits are sweet and edible. 2. Ripe fruits are used against cough, burns, and kidney problems.
Ficus semicordata Buch.-Ham. ex Sm.	*Jaintia:* Thylliang, Dieng-jabo; *Khasi:* Soh-thorling, dieng-duit-lasas.	1. Sweet fruits are eaten by tribal people and squirrels. 2. Decoction of root-bark is drunk for curing snake-bite.

due to high usage by the Khasi tribes. Almost 20 informants reported this species as highly edible. *F. cyrtophylla* and *F. hirta* exhibited low FC values because only a few informants reported the usage of these species. The TIV was maximum for *F. hispida* and *F. benghalensis* and minimum for *F. pumila*, *F. hispida*, and *F. racemosa*. *F. hispida* with a 67% TIV value is the maximum value of TIV Indices. Thus higher TIV Values show the greater importance of the *F. hispida*.

Table 2. Various indices of usage and utility for ten species of *Ficus* L. used by the Khasi and Jaintia tribes in Meghalaya.

Scientific name	UV	FC	RFC	CI	TIV (%)
F. auriculata	0.029	10.00 (Edible)	0.149 (Edible)	0.14	25
F. benghalensis	0.044	3.33 (Medicinal) 4.0 (Sacred purpose)	0.049 (Medicinal) 0.059 (Sacred purpose)	0.11	67
F. curtipes	0.014	0.5 (Ornamental) 1.00 (Fodder)	0.007 (Ornamental) 0.014 (Fodder)	0.059	22
F. cyrtophylla	0.014	3.0 (Edible) 0.5 (Wood)	0.44 (Edible) 0.007 (Wood)	0.044	22
F. elastica	0.19	5.0 (Living-root Bridge) 2.0 (Rubber)	0.074 (Living-root Bridge) 0.029 (Rubber)	0.194	22
F. hirta	0.059	2.5 (Edible) 0.5 (Medicinal)	0.0373 (Edible) 0.007 (Medicinal)	0.104	22
F. hispida	0.11	3.33 (Edible) 0.66 (Medicinal)	0.049 (Edible) 0.009 (Medicinal)	0.179	67
F. pumila	0.149	6.0	0.089	0.119	11
F. racemosa	0.179	5.0 (Edible) 3.5 (Medicinal)	0.074 (Edible) 0.0522 (Medicinal)	0.149	33
F. semicordata	0.044	3.5 (Edible) 1.0 (Medicinal)	0.052 (Edible) 0.014 (Medicinal)	0.134	22

[Abbreviations : UV = Use value, FC = Frequency citation, RFC = Relative frequency citation, CI = Cultural Index, TIV = Total importance value].



(1) **(2)**

Fig. 1. and Fig. 2. Map of India showing different districts of Meghalaya and location of the villages of the informants in Meghalaya. (● indicates the surveyed areas).

Fig. 3. Different *Ficus* spp. of Meghalaya collected during the survey.

CONCLUSION

This study reports a quantitative ethnobotanical survey of 10 *Ficus* spp. in the Khasi and Jaintia Hills. The information will help the local people to create ownership of the unique resource of *Ficus* flora. These tribes are well acquainted with the use value of *Ficus* species with some glaring examples such as living root bridges made from *F. elastica* roots, which attract thousands of tourists every year and add to the local economy substantially.

ACKNOWLEDGEMENTS

The financial support for this work was received from the Botanical Survey of India, Ministry of Environment, Forests and Climate Change under the Flora of India Project. The authors (SSS and CD) are highly thankful to the local people of Khasi and Jaintia hills and are grateful to Dr. A.A.Mao, Director of the Botanical Survey of India, and to the Heads of the Offices of Central National Herbarium, Howrah and Eastern Regional Centre of BSI, Shillong for herbarium consultation and other facilities. The first author (SSS) is highly thankful to Mrs. Sagari Chaudhury and Mr. J. V. Sudhakar for their kind help in many ways. The senior author (US) acknowledges the facilities afforded at the Department of Botany, North-Eastern Hill University, Shillong, India.

REFERENCES

Bano A, Ayub M, Rashid S, Sultana S, Sadia H (2013) Ethnobotany, and conservation status of floral diversity of Himalayan range of Jammu and Kashmir Pakistan. Pak J Bot 45: 243-251.

Belal AE, Leith B, Solway J, Springuel I (1998) Environmental valuation and management of plants in Wadi Allaqi, Egypt: final report. https://idl-bnc-idrc.dspacedirect. org/handle/10625/13821.

Berg CC (1989) Classification and distribution of *Ficus*. Experientia 45: 605- 611.

Berg CC (2001) Moraceae, Artocarpeae and Dorstenia (Moraceae): with introductions to the family and Ficus and with additions and corrections to Flora Neotropica Monograph 7, (Flora Neotropica Monograph 83), New York.

Berg CC (2003a) Flora Malesiana precursor for the treatment of Moraceae 1: The main subdivision of *Ficus*: the subgenera. Blumea 48: 167-178.

Berg CC (2003b) Flora Malesiana precursor for the treatment of Moraceae 2: *Ficus* subgenus *Pharmacosycea* section *Oreosycea*. Blumea 48: 289-301.

Berg CC (2003c) Flora Malesiana precursor for the treatment of Moraceae 3: *Ficus* subgenus *Ficus.* Blumea 48: 529-550.

Berg CC (2003d) Flora Malesiana precursor for the treatment of Moraceae 4: *Ficus* subgenus *Synoecia*. Blumea 48: 551-571.

Berg CC (2003e) Flora Malesiana precursor for the treatment of Moraceae 5: *Ficus* subgenus *Sycidium*. Blumea 48: 573-597.

Berg CC (2004a) Flora Malesiana precursor for the treatment of Moraceaea 6: *Ficus* subgenus *Sycomorus*. Blumea 49: 155-200.

Berg CC (2004b) Flora Malesiana precursor for the treatment of Moraceaea 7: *Ficus* subgenus *Urostigma*. Blumea 49: 463-480.

Berg CC, Corner EJH (2005) Moraceae-*Ficus*. In: Nooteboom, HP (ed), Flora Malesiana series I (Seed plants) National Herbarium Nederland, Universiteit Leiden branch, The Netherlands 17(2): 1-730.

Chaudhary LB, Sudhakar JV, Kumar A, Bajpai O, Tiwari R, Murthy GVS (2012) Synopsis of the Genus *Ficus* L. (Moraceae) in India. Taiwania 57(2): 193-216.

Corner EJH (1958) An introduction to the distribution of *Ficus*. Reinwardtia 4: 15-45.

Corner EJH (1960) Taxonomic notes on *Ficus* L. Asia and Australasia I-IV. Gard Bull Singapore 17: 368-485.

Corner EJH (1965) Check List of *Ficus* in Asia and Australasia with keys to identification. Gard Bull Singapore. 21(1): 1-186.

Corner EJH (1967) *Ficus* in the Solomon Islands and its bearing on the post-Jurassic history of Melanesia. Phil Trans Royel Soc Land B 253: 23-159.

Corner EJH (1969) *Ficus* sect. Adenosperma. Phil Trans Royel Soc Land B 256: 319-355.

Corner EJH (1975) New taxa of *Ficus* (Moraceae). Blumea 22(2): 299-309.

Faruque MO, Uddin SB, Barlow JW, Hu S, Dong S *et al.* (2018) Quantitative ethnobotany of medicinal plants used by indigenous communities in the Bandarban district of Bangladesh. Front Pharmacol 9(40): 1-5.

Hazara PK (1981) nature and conservation in Khasi folk beliefs and taboos. In: Jain SK (ed.) Gilmpses of Indian Ethnobotany. Oxford and IBH Publishing Co. New Delhi. 149-152.

Hooker JD (1888) The Flora of British India, L. Reeve and Co., London 5: 477-544.

Kanjilal UN, Kanjilal PC, De RN, Das A (1940) Flora of Assam, Government of Assam. 4: 232-277.

Kharkongor P, Joseph J (1981) Folklore medicobotany of rural Khasi and Jaintia tribes in Meghalaya. In: Jain SK (ed.) Glimpses of Indian Ethnobotany. Oxford and IBH Publishing Co. New Delhi. 124-136.

King G (1887-1888) The species of *Ficus* of the Indo-Malayan and Chinese countries. Ann Roy Bot Gar, Calcutta. 1: 1-185.

Patel A, Shah H, Gandhi T (2022) Saponin rich fraction of *Bauhinia variegata* Linn. ameliorates kidney stone formation in rats. Explor Anim Med Res 12(1): 74-84. DOI: 10.52635/eamr/ 12.1.74-84.

Pattanayak S (2021) Plants in healthcare: past, present and future. Explor Anim Med Res 11(2): 140-144. DOI: 10.52635/eamr/11.2.140-144.

Paul A, Sujatha K (2022) Concurrent effect of *Linum usitatissimum* and *Emblica officinalis* on lead induced oxidative stress and histomorphological changes in uterus of female Wistar rats. Explor Anim Med Res 12(2): 264-272. DOI: 10.52635/eamr/12.2.264-272.

Phillips O, Gentry AH, Reynel C, Wilki P, Gavez-Durand CB (1994) Quantitative ethnobotany and Amazonian conservation. Conserv Biol 8: 225-248.

Pradhan DK, Ghosh J, Lepcha N, Nandi A, Banerjee D *et al.* (2021) New ethnomedicinal information from Lepcha community of Dzongu, Sikkim. Explor Anim Med Res 11(2): 179-187. DOI : 10.52635/eamr/11.2.179-187.

Rawat DS, Kharwal, AD (2021) Quantitative ethnobotany of Different *Ficus* species in Shivalik Hills, Himachal Pradesh (India). Int J Botany Stud 6(6): 1214-1216.

Roxburgh W (1832) Flora Indica, vol. 3, Government Press, Serampore, India.

Shankar U (2021) Enumeration of the flora of Northeast India - One list of over 10,000 taxa of flowering plants. AFB flora series on flowering plants of the Indian subcontinent, Vol. 1, 1st edn. Arshuma Famous Books, Agra, India.

Cite this article as: Sensarma S, Deori C, Shankar U (2023) Quantitative ethnobotany of some *Ficus* L. species in Khasi and Jaintia hills, Meghalaya, India. Explor Anim Med Res 13(Ethnomed. Spl.): 102-108, DOI: 10.52635/eamr/13(S)102-108.