

## Using Measurable Indices to Evaluate the Cultural Importance of Socio-religious Plants: Comparative Data from the Three States of India

Kavi K. Oza                      Department of Botany, Faculty of Science, the Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India  
Suchitra Chatterjee            Department of Botany, Faculty of Science, the Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India  
Shrey Pandya                    Department of Statistics, Faculty of Science, the Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India  
Vinay M. Raole                 Department of Botany, Faculty of Science, the Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India

Corresponding email         kavioza3018@gmail.com

### ABSTRACT

The aim of the present study is to do the balancing between the science and cultural practices in an increasingly complex developing society and policy on the traditional knowledge landscape. Various quantitative indices are proposed to determine the cultural importance of socio-religious and ethnobotanically valuable plants as a tool for the evaluation of cultural heritage. These indices were applied to an ethnobotanical, sociocultural survey of plants and plant parts traditionally used and consumed in the selected study area. Selected plants were grouped into seven use categories for further analysis. The cultural value index (CV), use value index (UV), the relative frequency of citation (RFC), relative importance (RI), and cultural importance index (CI) were calculated for different plant species cited by 45 informants in different traditional societies from the studied states. The calculated values of the cultural importance of plants through diverse indices generated interesting variations from three regions of India. There were eight common species through all the three states. Among these eight species *Butea monosperma* shows the highest values from Rajasthan and *Ziziphus jujube* shows the lowest values from Gujarat region. While *Nelumbo nucifera*, *Vigna mungo*, and *Nymphaea lotus* were also portrayed high calculated values in the CI, RI, and CVs. The combined use of these indices makes it possible to quantify the role which has given to a particular plant within a specific culture in one or many festivals in general or religious rituals.

Keywords: Cultural importance, ethnobotany, EthnobotanyR, socio-cultural valuation

### INTRODUCTION

There is an implicit assumption that most Local Ethnobotanical Knowledge is accumulated through experiences of close contact with the natural environment, and therefore locality plays a large part in shaping this knowledge (Davis and Wagner, 2003). Local knowledge is protected and transmitted over centuries from one generation to another having long history of cultural heritage and ethnic practices. Among the indigenous society this knowledge forms the collective traditional wisdom which includes social, cultural, economic,

and environmental values. The word culture is derived from the Latin term ‘cult’ or ‘cultus’ that is cultivating or refining and worship. In Indian context it is practically termed as the way of life that is ‘Sanskriti’ which includes norms, values, beliefs, myths, legends, literature, ritual, art forms and other intellectual-literary activities. Culture consists of the ways in which we think and act as members of a society. By and large, cultural transmission is about the relationship of living beings with one another and with their environment (Gadgil *et al.*, 1993).

India is an important biodiversity centre with presence of over 45,000 different plant species. Of these, about 15,000-20,000 plants have good medicinal value and only 7,000-7,500 species are used for their medicinal values by traditional communities (Rana *et al.*, 2016). India is a country with the traditions of conservation of nature and land of diverse natural resources. These traditions are associated with use of wild as well as cultivated plants or plant parts (Vijendra and Kumar, 2010). In India, the earliest mention of uses of plants is found in the ancient Sanskrit literature like Rigveda (4000-1500 BC) where 67 plants have been mentioned for their healing properties and having medicinally importance.

An attempt has been made to get information about the traditional cultural, social, and economic values to record and document the knowledge that still exist with different community living in three different states of India viz. Bengal, Rajasthan, and Gujarat. However, past reports have ignored detailed study on spiritual believes and cultural values of plants in different societies that gives higher social recognition on it. Various religious rituals and social activities are carried out for one or more deities. These are worshipped using actions, process and products prescribed by texts or priests or local tradition (Nath and Mukherjee, 2015). The Hindu is one of the largest and oldest religions in the globe (Mahalik and Parida, 2018) and Hindu festivals help to enhance and preserve local cultures, especially when festivals become local traditions after many years of celebration (Yolal *et al.*, 2009).

In the present report we have tried to understand the relationship of some festivals, culture, and their association with the plant or plants parts from three different states of India. As there is certain plant or plants which have the essential requirement on that specific day or festival due to its direct relationship with that deity. At the same time, some plants are used in numerous festivities and societal gatherings also. Here we are trying to merge the different approaches to allow for a more comprehensive valuation of the importance of plants species for human societies. Our aim is to present and evaluate various indices such as Use-Value index (UV), Relative frequency of citation (RFC), Cultural value index (CV), cultural importance index (CI) of common plants documented in three regions and discussing their advantages and disadvantages. To do so, we rely on the information about useful plants traditionally used in different specific festivals or socio-cultural aspect including its economic valuation including comparison to understand the variability.

## METHODS

### Data Collection

Three different states of India – Bengal, Gujarat and Rajasthan are selected for this study to document the cultural, economic, and social importance of plant species used in different festivals. Data collection was done during the year 2019 to 2021. Ethnobotanical methods such as in-depth interviews, participant observation (Prance *et al.*, 1987; Kremen *et al.*, 1998), semi-structured questionnaires, and focus groups (Quinlan, 2005) were all employed in the data collection. The interview focused on basic questions concerning the informant’s knowledge of the uses and significance of plants use during different festivals and occasions.

The work also included a considerable preliminary meeting with local elders and community leaders followed by field work, observation, and collection. Information about the traditional practices performed in different festivals with their own cultural believes which has been passed from generation to generation was collected. During the field visits, specimens were also collected and identified with the help available literature and flora (Cooke, 1903; Bhandari 1978; Shah, 1978) and properly processed after following standard methods. Voucher specimen herbarium are deposited in the BARO herbarium, Department of Botany, the M S University of Baroda, Vadodara. The research set out to learn all the possible details about the use and cultural significance of regional plants including cultural, spiritual, and conservation practices. A total of 45 informants between the ages of 25 to 85 were interviewed in which 16 from Bengal, 15 from Rajasthan and 14 informants from Gujarat.

### Data Analysis

Designing appropriate use categories is important to any ethnobotanical study (Hoffman and Gallaher, 2007). Ethnobotanical knowledge was expressed in many ways e.g., medicine, food, spiritual practices, stories, legends, folklore, rituals, and customary laws. Therefore, making indices that fit well to the community involved creating use report categories based on the basic questions that were asked and the diversity of answers that were received. After the collection of data, it has been segregated in pre-defined use categories (Table 1). Every use has been given the value according to the use of that specific species by the local people. It is important that methods and experimental design replicate studies that have already been performed to identify similarities and differences in the use of native species (Belovsky *et al.*, 2004; Albuquerque *et al.*, 2006). Therefore, the ‘use values’ indices developed by Prance *et al.* (1987) and further developed by Phillips and Gentry (1993a, 1993b) form the foundation of the quantitative ethnobotany methods employed in this investigation, which also include the cultural importance index (CI) (Tardio and Pardo-de-Santayana, 2008), the frequency of citation (FC), and number of uses per species (NU) (Sujarwo and Caneva, 2016).

Table 1. Researcher defined use categories and reported uses in each category

Use Category	Gujarat		Bengal		Rajasthan	
	Total Uses Reported	Percentage	Total Uses Reported	Percentage	Total Uses Reported	Percentage
Prasad	62	14.00	41	10.59	45	11.87
Decoration	85	19.19	78	20.16	51	13.46
Mythological belief	57	12.87	70	18.09	83	21.90
Offerings	74	16.70	56	14.47	62	16.36
Food	71	16.03	62	16.02	45	11.87
Fodder	54	12.19	40	10.34	49	12.93
Others	40	9.03	40	10.34	44	11.61
Total	443		387		379	

## RESULTS AND DISCUSSION

Cultural and economic valuation survey was conducted in three different regions of India which were Bengal, Rajasthan, and Gujarat. In which the common festivals celebrated in these regions are Navratri puja, Laxmi puja, Sheetla Saptami and the different festival which is celebrated particularly to a region is Saraswati puja in Bengal, Uttrayan in Gujarat, and

Gangaur in Rajasthan. Total 120 Plant species are recorded which are used in different festivals and cultural ceremony with different mythological believes incorporated in society. Among these 120 plant species most important and most used plant species were selected for Bengal (39), Gujarat (28), and Rajasthan (29) respectively. After detailed investigation and deliberations we have found out 8 common plant taxa from all three states (Table 2).

All plant species belongs to 45 families in which Poaceae, and Fabaceae families have maximum number of species in all three regions. There are 9 species of Poaceae (20%) and 18 species of Fabaceae (40%) used in Bengal and 19 families out of 36 like Combretaceae and many others have 1 species each (2.77%) only. In totality 7 species of Poaceae (22.58%) and 4 species of Fabaceae (12.9%) used in Rajasthan culture and 18 families out of 31 like Musaceae and many others have 1 species each (3.22%) only. Over and above in Gujarat state 6 species of Poaceae (23.07%) and 8 species of Fabaceae (30.76%) are used, and rest 16 families have 1 species each (3.84%) only.

Table 2. Different indices for eight common plant species found from three states (UR-User report, FC-Frequency of citation, NU-Number of uses, RFC-Relative frequency of citation, RI-Relative importance index, UV-Use value index, CV-Cultural value index)

State	Plant Species	U R	F C	N U	RFC	RI	UV	CV
<b>Bengal</b>	<i>Aegle marmelos</i> (L.) Corrêa	16	11	5	0.69	0.76	1	0.49
	<i>Azadirachta indica</i> A.Juss.	16	10	6	0.62	0.81	1	0.54
	<i>Butea monosperma</i> (Lam.) Taub.	10	8	3	0.5	0.5	0.62	0.13
	<i>Ficus religiosa</i> L.	11	9	2	0.56	0.45	0.69	0.11
	<i>Nelumbo nucifera</i> Gaertn.	22	16	4	1	0.83	1.37	0.77
	<i>Nymphaea lotus</i> L.	20	15	3	0.94	0.72	1.25	0.50
	<i>Vigna mungo</i> (L.) Hepper	17	13	4	0.81	0.74	1.06	0.49
	<i>Ziziphus jujuba</i> Mill.	10	7	4	0.44	0.55	0.62	0.16
<b>Gujarat</b>	<i>Aegle marmelos</i> (L.) Corrêa	16	11	6	0.79	0.89	1.14	0.77
	<i>Azadirachta indica</i> A.Juss.	12	9	4	0.64	0.65	0.86	0.31
	<i>Butea monosperma</i> (Lam.) Taub.	10	8	4	0.57	0.62	0.71	0.23
	<i>Ficus religiosa</i> L.	9	9	3	0.64	0.57	0.64	0.18
	<i>Nelumbo nucifera</i> Gaertn.	17	11	6	0.79	0.89	1.21	0.82
	<i>Nymphaea lotus</i> L.	15	10	3	0.71	0.61	1.07	0.33
	<i>Vigna mungo</i> (L.) Hepper	24	13	6	0.93	0.96	1.71	1.36
	<i>Ziziphus jujuba</i> Mill.	9	8	3	0.57	0.54	0.64	0.16
<b>Rajasthan</b>	<i>Aegle marmelos</i> (L.) Corrêa	21	13	4	0.87	0.83	1.4	0.69
	<i>Azadirachta indica</i> A.Juss.	15	11	5	0.73	0.87	1	0.52
	<i>Butea monosperma</i> (Lam.) Taub.	30	14	4	0.93	0.87	2	1.07
	<i>Ficus religiosa</i> L.	10	9	3	0.6	0.6	0.67	0.17
	<i>Nelumbo nucifera</i> Gaertn.	16	10	4	0.67	0.73	1.07	0.41
	<i>Nymphaea lotus</i> L.	11	9	3	0.6	0.6	0.73	0.19
	<i>Vigna mungo</i> (L.) Hepper	20	13	5	0.87	0.93	1.33	0.82
	<i>Ziziphus jujuba</i> Mill.	11	9	4	0.6	0.7	0.73	0.25

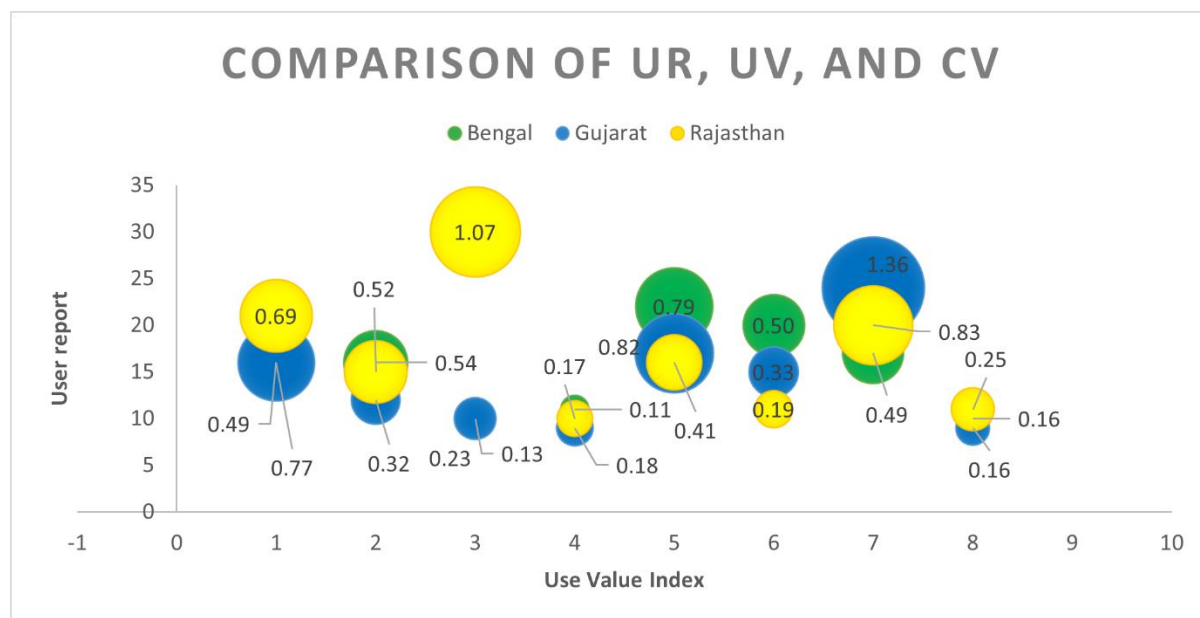


Figure 1. Comparison of user report, use value and cultural value index

Figure 1 shows the comparison between three most important indices which helps in understanding the use value. The size of the bubble depicts the cultural value index. The calculated UR and UV values are lower in Bengal, but they have significantly higher cultural value index. Moreover, the calculated values of UR, UV, and CV in other two states are correspondingly higher. In Gujarat and Rajasthan value of CV enhances with the increase in values of UR and UV.

Figure 2 depicts the comparison between Number of uses, frequency of citation and relative frequency of citation. Here the size of the bubble depicts the relative frequency of citation. It has also been found that there is no direct relationship between frequency of citation and relative frequency of citation index. Because some plant species have higher number of uses but lower relative frequency of citation which means that species is used more often but not by many informants. Some of the species shows lower values of citation but their values of relative frequency of citation were high which means that these species are cited by few informants but in a greater number of use categories.

Most of the earlier ethnobotanical studies from the three states depicted only compilation and documentation of used plants list by common man (Deb and Malhotra, 2001; Gavali and Sharma, 2004; Rana et al., 2016). This traditional methodology is not sufficient to clarify the role of a particular plant species and its importance within a particular socio-religious community. Our study helps us to understand the importance indices to quantify the role that a given plant plays within a particular culture. By and large, different use value indices are used to evaluate and classify these useful plants according to their respective cultural significance. These Quantitative methods are way of improving the traditional compilation style by obtaining data using in-depth, semi-structured interviews and calculating different indices (Romney et al., 2009). This comparative list is based on different mythological believes and which has great cultural value in various festival which are commonly celebrated among these three regions (Katewa et al., 2003; Jharia, 2012; Ghosh, 2017), and specific festivals celebrated only in one region like Durga puja is only celebrated in Bengal, Gangaur is celebrated in Rajasthan, and Uttrayan is celebrated in Gujarat (Nath and Mukherjee, 2015; Gadgil et al., 2000). Apart from the common plants there are few plant species which are unique and used only in specific state such as *Aeschyemone aspera* in Bengal, *Butea*

*monosperma* in Rajasthan and *Lablab purpurea* from Gujarat (Mandal and Chattopadhyay, 2014). These plants are unique to each state and are widely used in that particular state.

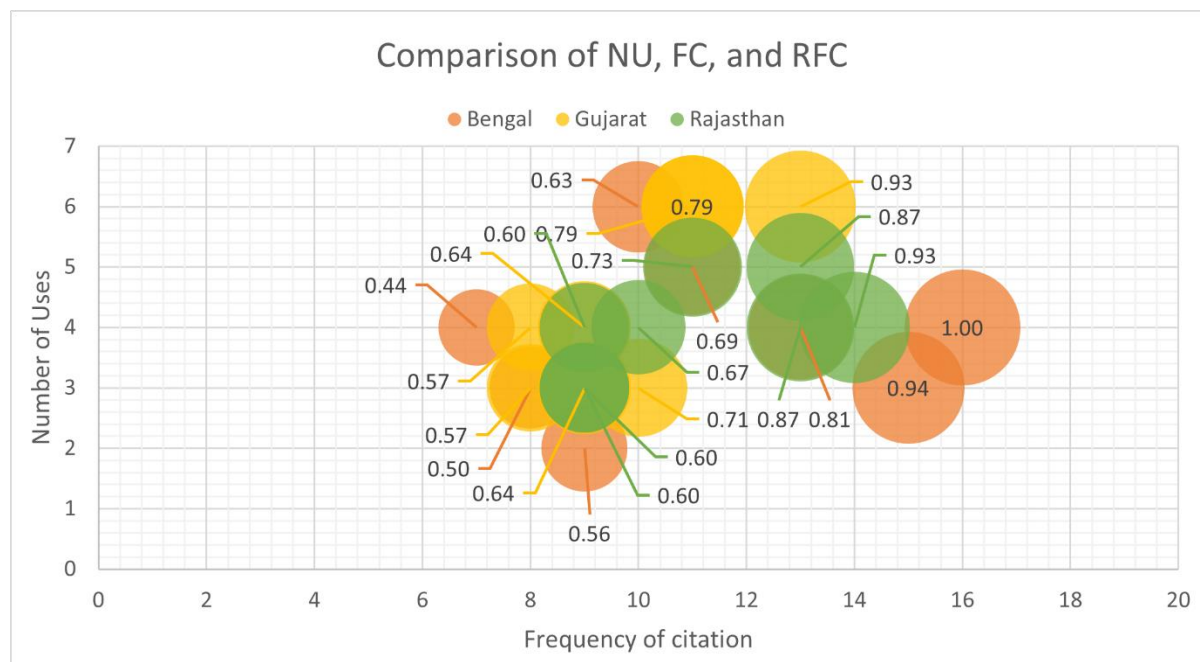


Figure 2. Comparison between number of uses, frequency of citation and relative frequency of citation

These kinds of indexes measure local people’s knowledge of how to use plants, and they operate better than free-list ancient approaches. The cultural importance index (CI) is a set of techniques for emphasising species that are based on informant consensus and consider a wide range of uses. Other indices, such as the RI, RFC, and CV, consider the number of uses and use informants in each use category. To determine the cultural value of plant species in three regions, Bengal, Rajasthan, and Gujarat, various indices were calculated (Table 3). Due to the higher number of citations, use categories, and multiplicity of uses, *Oryza sativa* ranks first in Bengal, indicating that this plant species has greater ethnobotanical and economic importance in the region, as well as being used in various festivals as offerings and consumed as a basic food crop. The values of calculated indices vary considerably from species to species and for each state. Though the UR and UV values in Gujarat and Rajasthan are high but Cultural value is higher in Bengal.

Table 3. Minimum and maximum values of calculate indices

Index	Bengal		Gujarat		Rajasthan	
	Min	Max	Min	Max	Min	Max
UR	1	27	6	29	3	30
FC	1	16	6	14	2	15
NU	1	6	2	6	2	5
RFC	0.062	1	0.429	1	0.133	1
RI	0.115	0.917	0.381	1	0.367	0.933
UV	0.062	1.688	0.429	2.071	0.2	2
CV	0.001	1.205	0.052	1.714	0.011	1.105

The various values of other indices such as RI, RFC, CV, and CI, which represent the ranking of different plants based on each index and their three essential values of the study, namely frequency of citations, number of usage reports, and number of uses for each species. The frequency of citations merely reflects the diffusion of useful plant information, whereas the number of usage-reports (other indices) indicates the diversity of use. There are significant variances in species ranking for the various indicators. Because of the higher number of citations and use categories, as well as the plurality of uses, *Oryza sativa* ranks top among all indexes.

Researchers from across the world have researched the high rates of biodiversity loss caused by growing anthropogenic activity (e.g., climate change, pollution, deforestation, overexploitation of natural resources, habitat loss and the introduction of exotic species). These type of studies helps us to understand about the importance of various plants and promotes in situ conservation of plants and benefits in improvement of mental health from our everyday stress condition in competitive modern life in metropolitan, urban and village areas. Some ecosystem services as a means to quantify biodiversity in economic terms, usually defined as the benefits people can extract from ecosystems (Laurila-Pant *et al.*, 2015). Such movement of monitoring and utilizing plant species for the sake of worshipping and socio-social convictions uncovers a solid immensity in the present worry of biodiversity preservation (Mahalik and Parida, 2018).

Plants identified in this study can also be utilised to cure a variety of ailments (Nath and Mukherjee, 2015). However, many of these customs are no longer in use, and just a handful have survived in the minds of the elderly as memories from the past. This preliminary study also flash lights on critical problem to the impact of extinction and also gives awareness about the uses of plants in various festival, socio-cultural perspectives can serve as the main factors in determining the success or failure of environmental management(Laurila-Pant *et al.*, 2015).

## CONCLUSION

This research aids in understanding how the Hindu indigenous population contributes to plant conservation in general to protect their inherent socio-cultural and religious activities. Cultural importance indices can be used to quantify the importance of a certain plant within a culture. Such indices produced interesting variations according to the different parameters that they considered. The use value (UV) index emphasises species that have many uses, even if these uses are only known to a few people in society. The relative importance (RI) index emphasises of those plants which have the greatest absolute number of uses, and it covers richness of use. The relative frequency of citation (RFC) index highlights shared information. Cultural values (CVs) highlight the breadth of uses of a plant, such as the breadth of the groups of informants. The cultural value of a plant then needs to be estimated through a multi-parameter approach that considers different factors and indices. We believe that our study will provide a higher quality of information on how and why people use plants and will contribute to the conservation of biological and cultural diversity. Hence, detailing of all other information about the plants in different socio-religious functions and festivals is warranted from the other society members.

## REFERENCES

- Albuquerque, U., Lucena, R., Monteiro, J., Nunes, A. and Almeida, C. 2006. Evaluating two quantitative ethnobotanical techniques. *Ethnobotany Research and Applications* 4: 51-60.
- Belovsky, G.E., Botkin, D.B., Crowl, T.A., Cummins, K.W., Franklin, J.F., Hunter, M.L., Joern, A., Lindenmayer, D.B., MacMahon, J.A., Margules, C.R. and Scott, J.M. 2004. Ten suggestions to strengthen the science of ecology. *BioScience* 54(4): 345-351.
- Cooke, T. 1903-1908. *The flora of the Presidency of Bombay, Vol. 1 and Vol. 2*. Taylor and Francis, London.
- Davis, A. and Wagner, J. R. 2003. Who knows? On the importance of identifying “experts” when researching local ecological knowledge. *Human Ecology* 31(3): 463-489.
- Deb, D. and Malhotra, K. 2001. Conservation ethos in local traditions: The West Bengal heritage. *Society and Natural Resources* 14: 711-724.
- Gadgil, M., Berkes, F. and Folke, C. 1993. Indigenous knowledge for biodiversity conservation. *Ambio* 22(2/3): 151-156.
- Gadgil, M., Rao, P.R.S., Utkarsh, G., Pramod, P. and Chhatre, A. 2000. New meanings for old knowledge: The people’s biodiversity registers program. *Ecological Applications* 10(5): 1307-1317.
- Gavali, D. and Sharma, D. 2004. Traditional knowledge and biodiversity conservation in Gujarat. *Indian Journal of Traditional Knowledge* 3(1): 51-58.
- Ghosh, S. 2017. Kojagari Lakshmi puja – rituals, believes and the divine Bengali feast platter. Saffronstreaks.
- Hoffman, B. and Gallaher, T. 2007. Importance indices in ethnobotany. *Ethnobotany Research and Applications* 5: 201-218.
- Jharia, H. 2012. Discover life: Rajasthani delicacy ‘Ker Sangri’: The leafless colorful beautiful Bush ‘Ker’... Desert Shrub Capparis Decidua. Discover Life.
- Katewa, S. S., Chaudhary, B. L., Jain, A. and Galav, P.K. 2003. Traditional uses of plant biodiversity from Aravalli hills of Rajasthan. *Indian Journal of Traditional Knowledge* 2: 27-39.
- Kremen, C., Raymond, I. and Lance, K. 1998. An interdisciplinary tool for monitoring conservation impacts in Madagascar. *Conservation Biology* 12(3): 549-563.
- Laurila-Pant, M., Lehtikoinen, A., Uusitalo, L. and Venesjärvi, R. 2015. How to value biodiversity in environmental management? *Ecological Indicators* 55: 1-11.
- Mahalik, G. and Parida, S. 2018. Study on the use of plants and plant parts in Durga Puja for worshipping of the Goddess Durga in Odisha, India. *International Journal of Technology Management* 8: 2911-2918.
- Mandal, R. N., Bar, R. and Chattopadhyay, D.N. 2014. Shola, *Aeschynomene aspera* L. used for making indigenous handicrafts revealing traditional art needs conservation. *Indian Journal of Traditional Knowledge* 13(1): 103-110.
- Nath, D. and Mukherjee, S. 2015. Evaluation of plants in Hindu mythology, festivals and rituals and their conservational aspect. *International Journal of Pharmaceutical Research and Bioscience* 4: 310-326.
- Phillips, O. and Gentry, A.H. 1993a. The useful plants of Tambopata, Peru: I. Statistical hypotheses tests with a new quantitative technique. *Economic Botany* 47(1): 15-32.
- Phillips, O. and Gentry, A.H. 1993b. The useful woody plants of Tambopata, Peru, II: Further statistical tests of hypotheses in quantitative ethnobotany. *Economic Botany* 47(1): 33-43.

- Prance, G.T., Baleé, W., Boom, B.M. and Carneiro, R.L. 1987. Quantitative ethnobotany and the case for conservation in ammonia. *Conservation Biology* 1(4): 296-310.
- Quinlan, M. 2005. Considerations for collecting freelists in the field: Examples from ethobotany. *Field Methods* 17(3): 219-234.
- Rana, S., Sharma, D.K. and Paliwal, P.P. 2016. Ritual plants used by indigenous and ethnic societies of District Banswara (South Rajasthan), India. *American Journal of Ethnomedicine* 3(1): 26-34.
- Romney, A.K., Weller, S.C. and Batchelder, W.H. 1986. Culture as consensus: A theory of culture and informant accuracy. *American Anthropologist* 88(2): 313-338.
- Shah, G.L. 1978. *Flora of Gujarat, Part I and II*. Sardar Patel University, Vallabh Vidyanagar.
- Sujarwo, W. and Caneva, G. 2016. Evaluation of the cultural importance of food and nutraceutical plants through quantitative indices: comparative data from Bali island (Indonesia). *Journal of Cultural Heritage* 18: 342-348.
- Tardío, J. and Pardo-de-Santayana, M. 2008. Cultural importance indices: A comparative analysis based on the useful wild plants of Southern Cantabria (Northern Spain). *Economic Botany* 62(1): 24-39.
- Vijendra, N. and Kumar, K.P. 2010. Traditional knowledge on ethno-medicinal uses prevailing in tribal pockets of Chhindwara and Betul Districts, Madhya Pradesh, India. *African Journal of Pharmacy and Pharmacology* 4(9): 662-670.
- Yolal, M., Çetinel, F. and Uysal, M. 2009. An examination of festival motivation and perceived benefits relationship: Eskişehir International Festival. *Journal of Convention and Event Tourism* 10: 276-291.

**Journal of Tropical Ethnobiology**

VOLUME IV

NUMBER 2

JULY 2021

**CONTENTS**

Ethnobotanical Study of Zingiberaceae Rhizomes as Traditional Medicine Ingredients by Medicinal Plant Traders in the Pancur Batu Traditional Market, North Sumatera, Indonesia

Marina SILALAH, NISYAWATI, Endang C. PURBA, Daichiro W. ABINAWANTO, and Riska S. WAHYUNINGTYAS ..... 78-95

Using Measurable Indices to Evaluate the Cultural Importance of Socio-religious Plants: Comparative Data from the Three States of India

Kavi K. OZA, Suchitra CHATTERJEE, Shrey PANDYA, and Vinay M. RAOLE ..... 96-104

The Utilization of Tokulo (*Kleinhovia hospita* L.) as Traditional Medicine by Wawonii Community in Lampeapi Village, Wawonii Island, Southeast Sulawesi

Nissa ARIFA, Mulyati RAHAYU, Siti SUNARTI, and RUGAYAH ..... 105-110

The hunt for the Blue tree monitor on Batanta Island, Indonesia: subsistence on a treasure?

Evy A. ARIDA, Alamsyah E.N. HERLAMBANG, and MULYADI ..... 111-117

Carbon Potentials in Biomass of Fruit Trees in Home Gardens in the Bogor Regency, West Java

Dian A. SUSANTO, Kuswata KARTAWINATA, and NISYAWATI ..... 118-129

Tebat Rasau Geopark: Ethnobiology and Ethnogeology of a Pleistocene River in Belitung, Indonesia

Ary P. KEIM, FITHROROZI, Tukul R. ADI, R. INDARJANI, Fauzi AKBAR, Yudi AMSONI, Ida F. HASANAH, and Wawan SUJARWO ..... 130-149

