International Journal of Botany Studies
www.botanyjournals.com
ISSN: 2455-541X
Received: 20-11-2021, Accepted: 05-12-2021, Published: 20-12-2021
Volume 6, Issue 6, 2021, Page No. 1214-1216

Quantitative ethnobotany of Different *Ficus* species in Shivalik Hills, Himachal Pradesh (India)

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Abstract
Plant resources are an inseparable part of human society and are the base for fulfilling basic needs of men and are important for the treatment of various diseases. Traditional medicines are used to maintain health and act differently from allopathic medicines in terms of theories and experiences.Shivalik hills of Himachal Pradesh are blessed with rich flora with a high cultural diversity. *Ficus* is a genus about 900 species of trees, shrubs and vines present all over the world. It belongs to family Moraceae and is a native of East Asia with a high ethnobotanical value. The benefits, importance and coverage of *Ficus* can be expressed through several quantitative indices such as Use Value (UV), Relative Frequency of Citation (RFC), Cultural Importance Index (CI) and Total Importance Index (TIV).The data pertaining to quantitative ethnobotany reveals that Use Value (UV), Cultural Index (CI) and Total Importance Index (TIV) is maximum in case of *Ficus religiosa* L. And Relative Frequency of Citation (RFC) is maximum for *Ficus palmata* Forsk.and minimum in case of *Ficus clavata* Wall.

Keywords: traditional medicines, Shivalik Hills, ethnobotanical value, quantitative indices

Introduction

Plant resources are an inseparable part of human society and are the base for fulfilling basic needs of men and are important for the treatment of various diseases. Traditional medicines are used to maintain health and act differently from allopathic medicines in terms of theories and experiences (Jima &Megersa, 2018). Ethnobotany in general denotes the useful relationship between plants and men. Ethnobotanical studies have great value in enhancing our traditional knowledge about plants used by local communities and the methods adopted by them for its preservation or conservation (Cohen *et al*., 1991). Shivalik hills of Himachal Pradesh were anciently known as 'Manak Parbat'. It literally means the "tresses of Shiva". Shivalik hills in Himachal Pradesh includes districts *i.e.* Kangra, Hamirpur, Una, Bilaspur and the lower parts of Mandi, Solan and Sirmaur with altitudinal variation of 350m to 1,500m above the sea level (Balokhra, 2002). Shivalik hills of Himachal Pradesh are blessed with rich flora with a high cultural diversity.The first systematic account of the Indian *Ficus* L. recorded 113 species and 47 infraspecific taxa from whole British India out of which only 75 species and 16 infraspecific taxa were reported from the present political boundary of India (Chaudhary *et al*., 2012). It belongs to family Moraceae and is a native of East Asia with a high ethnobotanical value. The benefits, importance and coverage of *Ficus* can be expressed through several quantitative indices such as Use Value (UV), Relative Frequency of Citation (RFC), Cultural Importance Index (CI) and Total Importance Index (TIV). Use value (UV) signifies the number of uses mentioned by the informants on the basis of interviews while Relative Frequency of Citation (RCF) gives us an idea of local importance of a particular species. Cultural Importance Index (CI) reflects a measure of relative importance per plant use (Faruque *et al*., 2018) and Total Importance index (TIV) reflects the number of ways a plant can be used in term of percentage (Belal & Springuel, 1996).

Materials and Methods

Ethnobotanical information of different species of *Ficus* was recorded in Shivalik hills of districts Kangra and Hamirpur following Phondani *et al.*, 2010 and nomenclature was confirmed from Bennet (1986) and Wielgorskaya (1995). In total, 100 informants of different age groups were interviewed to record ethnobotanical data.

Use Value (UV) was calculated following Faruque *et al.*, (2018) using following formula:

$$UV = \sum Ui/N$$

Ui: Number of uses mentioned by informants for a given species
N: Total number of informants interviewed.

Relative Frequency of Citation (RFC) was calculated following Tounekti *et al*., (2019) using following formula:
RFC = FC/N (0 < RFC < 1)
FC: Number of informants citing a useful species
FC: Number of informants who mentioned the use of a species = Number of times a species is mentioned / Total number of times all the species mentioned ×100

N: Total participants in survey

Cultural Index (CI) was calculated by using following formula (Reimers *et al.*,2018)

$$CI = \sum_{u=ui}^{uNC} \sum_{i=i1}^{iN} UR_{ui}/N$$

UR: Use Reports for a particular plant
N: Total number of informants

Total Importance Index (TIV) was calculated by using Belal & Springuel (1996) by assigning values to different categories of plant uses (1-4) on the basis of variety of uses and then the final value was calculated in percentage.

Conclusion

The ethnobotanical data recorded for 12 species of *Ficus* found in Shivalik Hills of Kangrain terms of diverse uses including edible and medicinal value has been summarized in Table 1. The data pertaining to quantitative ethnobotany reveals that Use Value (UV), Cultural Index (CI) and Total Importance Index (TIV) are maximum in case of *Ficus religiosa* L. And Relative Frequency of Citation (RFC) is maximum for *Ficus palmata* Forsk.and minimum in case of *Ficus clavata* Wall.(0.02, 0.35, 0.04 and 22%). As for as other species are concerned, the plants with good UV value after *Ficus religiosa* L. are: *Ficus glomerata* Roxb. and *Ficus benghalensis* L. (0.18 and 0.12); other plants with good RFC value are : *Ficus benghalensis* L., *Ficus religiosa* L. and *Ficus roxburghii* Wall. *Ex* Miq.(0.60, 0.57 and 0.55).*Ficus glomerata* Roxb., *Ficus benghalensis* L. and *Ficus palmata* Forsk. have good CI vlaues (0.33, 0.23 and 0.23). *Ficus glomerata* Roxb.and *Ficus hispida* L. have been reported with good TIV values (56% each) (Table 2 and Figure 1). As for as the consumption of natural resources is concerned, mostly fruits, leaves and latex are used; *i.e.* 13, 11 and 10 times for different *Ficus*species (Fig. 2).

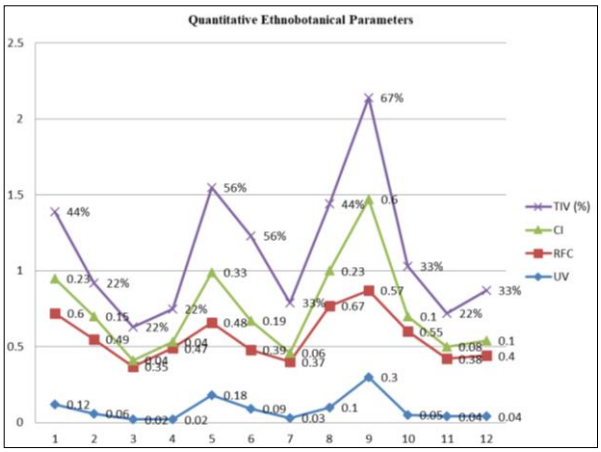

Fig 1: Quantitative Ethnobotanical Parameters of *Ficus* X Axis (1-12): 12 species of *Ficus*as mentioned in Table 1. Y Axis: Values of Ethnobotanical Parameters

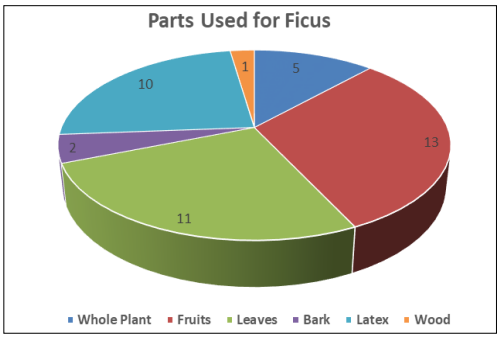

Fig 2: Pie Chart of Different Plant Parts Used For*Ficus*

Table 1: Table Showing Different *Ficus* Species with their Ethnobotanical Uses

S.N.	Botanical Name	Vernacular Name	Ethnobotanical Value
1.	*Ficus benghalensis* L.	Badein	Sacred Poultice – Herpes Latex- Toothache, Chewing gum, Demaged heels, Boils, bone fracture, Leucorrhoea,Rheumatism Fruits-Edible Leaves-Fodder
2.	*Ficus carica* L.	Anjeer.	Fruits- Edible Fruits-Purgative, Laxative, Emollient, Leprosy Latex- Leprosy along with the oil of *Celastruspaniculatus*, Piles
3.	*Ficus clavata* Wall.	Feguda.	Fruits-Edible Leaves- Fodder
4.	*Ficus foveolata* Wall.	Phaegri.	Fruits-Edible Leaves- Fodder
5.	*Ficus glomerata* Roxb.	Umbrein.	Sacred Wood-Fuel Leaves- Fodder, for “Havan” Latex- Lubricant Fruits and Bark- asthma, bilious affections, blisters, boils, bronchitis, dermatitis, diabetes, diarrhoea, dyeing, glandular enlargements, gonorrhoea.
6.	*Ficus hispida* L.	Dagrein.	Fruits- Edible and vegetable Abortion in cattles Leaves-Fodder, galactagogue (vet.), shedding of placenta (vet.), Latex- Boils, ulcers in mouth, warts, and wounds
7.	*Ficus infectoria* Roxb.	Pallakharein.	Sacred Leaves-Fodder Latex- wounds along with Mustard oil
8.	*Ficus palmata* Forsk.	Dhuda, Dougla, Khasra	Fruits – Edible, Vegetable, For making chutney and anti-Diabetic, conspitation, Demulscent, dysentery, high blood pressure, indigestion Latex- Drawing out thorns Leaves-Fodder
9.	*Ficus religiosa* L.	Bad,Peepal.	Sacred Latex&Fruits along with ash-cough, Bronchitis,abortifacient, absorbent in inflammatory swelling, antidote to snake bite, astringent, colouration material and fixative, contraceptive, blisters, boils, bowels, bronchitis (vet.), burns, carbuncle, cholera, chronic liver disorders, constipation (vet.), cough (vet.), dyeing, dysentery, eczema, enhancing memory, fever, foot and mouth disease (vet.), gonorrhoea, gum, leucorrhoea
10.	*Ficus roxburghii* Wall. *ex* Miq.	Traimbal.	Fruits – Edible, Vegetable. Bark – Boils along with coconut oil Leaves- Fodder, Galactagogue (vet.). Latex-Ringworms

11.	*Ficus rumphii* Blume	Badarein	Leaves- Fodder Fruit- Anthelmintic, Asthma, Vomitimg
12.	*Ficus semicordata* Buch.-Ham. *ex* Sm.	Khasarkhurein.	Fruits- Edible, Vegetable, dysentery, leprosy Leaves- Fodder

Table 2: Table Showing Different *Ficus* Species in Relation to Quantitative Parameters

S.N.	Botanical Name	UV	RFC	CI	TIV (%)
1.	*Ficus benghalensis* L.	0.12	0.60	0.23	44%
2.	*Ficus carica* L.	0.06	0.49	0.15	22%
3.	*Ficus clavata* Wall.	0.02	0.35	0.04	22%
4.	*Ficus foveolata* Wall.	0.02	0.47	0.04	22%
5.	*Ficus glomerata* Roxb.	0.18	0.48	0.33	56%
6.	*Ficus hispida* L.	0.09	0.39	0.19	56%
7.	*Ficus infectoria* Roxb.	0.03	0.37	0.06	33%
8.	*Ficus palmata* Forsk.	0.10	0.67	0.23	44%
9.	*Ficus religiosa* L.	0.30	0.57	0.60	67%
10.	*Ficus roxburghii* Wall. *ex* Miq.	0.05	0.55	0.10	33%
11.	*Ficus rumphii* Blume	0.04	0.38	0.08	22%
12.	*Ficus semicordata* Buch.-Ham. *ex* Sm.	0.04	0.40	0.10	33%

Acknowledgements
The authors are highly thankful to the rural populace of Kangra Shivalik hills for sharing their traditional knowledge.

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