International Journal of Botany Studies
ISSN: 2455-541X; Impact Factor: RJIF 5.12
Received: 16-11-2020; Accepted: 02-12-2020: Published: 11-12-2020
www.botanyjournals.com
Volume 5; Issue 6; 2020; Page No. 593-598

Importance of plants in and around Bhadravathi Taluk, Karnataka: An overview

S Thirumala[1], BR Kiran[2]
[1] Department of Environmental Science, Government First Grade College and PG Center, Anubav Mantapa, Davanagere Karnataka, India
[2] Research and Teaching Assistant in Environmental Science, DDE, Kuvempu University, Shankaraghatta, Karnataka, India

Abstract
The review article deals with importance/uses of flora occurring in B.R.Project area of Bhadravathi taluk of Karnataka is reviewed based on published data. A total of 33 weed plants were recorded by various researchers, out of 21 families Euphorbiaceae was dominant with 6 species and Amaranthaceae by 3 species and 2 species each in Asteraceae, Apocynaceae, Convolvulaceae, Solanaceae and Malvaceae respectively. However, edible and wild leafy vegetables data provides the information of 44 species and 36 genera of 26 families. Among families Amaranthaceae is dominant with 12 species followed by Fabaceae with 4 species and Poaceae, Asteraceae, Portulacaceae, Lamiaceae with 02 species each respectively. Rest of the families consists of single species. Regarding fodder yielding plants a total of 47 plant species belonging to 27 families were reported which are sources of fodder to the livestock. Among 27 families Fabaceae is dominant with 8 species. Agriculture and animal husbandry are the main occupation in the study area. The diversity of fodder plants is a proportion of the enormous biodiversity occurring in this region. The peoples of this area mainly depend on plants and leafy vegetables as substitute food resources other than cultivated vegetables. This review depicts that characterization of plants, active principle, standardization of their cultivation and formulation of new drugs would be useful for curing many dreadful diseases.

Keywords: flora, bhadravathi area, nutritional value, wild leafy vegetables, fodder plants

Introduction
Indian weedy plants are known for their medicinal values and being used in various traditional systems of medicines like ayurveda, homeopathy, siddha, folk and unani, etc. Many plants are on the verge of extinction due to unplanned use. The species which grow on their own, without human efforts can be termed as weeds. They are in general harmful to the crops and can dominate the vegetation if not cared for. The weeds are of no use as they are harmful to crop. They are generally controlled from crop fields and destroyed. Many of the weeds are found to be medicinal importance (Gambhire and Biradar, 2016) [5].

Leafy vegetables contains nutrients, but they have photosynthetic tissues but their vitamin K contents in relation to fruits and vegetables and other types of foods, are particularly noteworthy. The cause is that phylloquinone, the most familiar form of the vitamin, is directly involved in photosynthesis. This causes leaf vegetables to be the primary food class that interacts significantly with the anticoagulant pharmaceutical warfarin (en.wikipedia.org; Nagaraj Parisara and Kiran, 2016) [16] The nutritional compounds present in wild plants are carbohydrates in the form of starch and sugars, protein, lipid, in the form of oil, vitamins, minerals, etc. Apart from these antioxidant, like ascorbic acid, phenols such as cholorogenic acid and its polymers are available in plant because of these component, the wild vegetable must have potential to improve physical as well as mental health, help in reduce the risk of disease (Aberoumand, A, et al, 2009; Atram Seema, 2015) [2]. Trees and shrubs have several disadvantages as sources of feed. They are often inaccessible to grazing animals. They are slow to establish requiring isolation from stock. Their foliage generally has higher fibre and lignin content than grasses (Wilson, 1969) [28], and often has higher levels of tannins and other astringent compounds than shorter herbaceous plants. Even though sometimes elevated in protein, they often have lower energy value than herbaceous plants due to their lesser digestibility (Lefroy et al., 1992) [13].

Since then, no sincere effort has been made to explore the importance of plants of Bhadravathi area pertaining to vegetables and plants used for specific disease. Hence, review effort has been made to list the herbal plants of the above-mentioned area used as pharmacological medicines.

Materials and methods
Study area
Bhadravati is an industrial town and taluk in the Shivamogga district of Karnataka, India It is situated about 255 kilometers away from the capital city Bengaluru and at about 20 kilometers from the district headquarters, Shivamogga (Tourism. Bhadravati city Municipal Council. Retrieved 2010-08-01.). This area is spread an area of 67.0536 Km^2 (25.8895 sq mi) and has a population of 151,102 as per the census held in 2011 (http://www.bhadravathicity.gov.in/). Bhadravati town located at the latitude and longitude of 13.840°N and 75.702°E (Google. "Bhadravati" (Map). Google Maps.). Bhadravati has an altitude of 597 metres above mean sea level. The Bhadra reservoir Project area is located at latitude 13°42' N and longitude 75°38'20" E and situated in Malnad region of Karnataka.

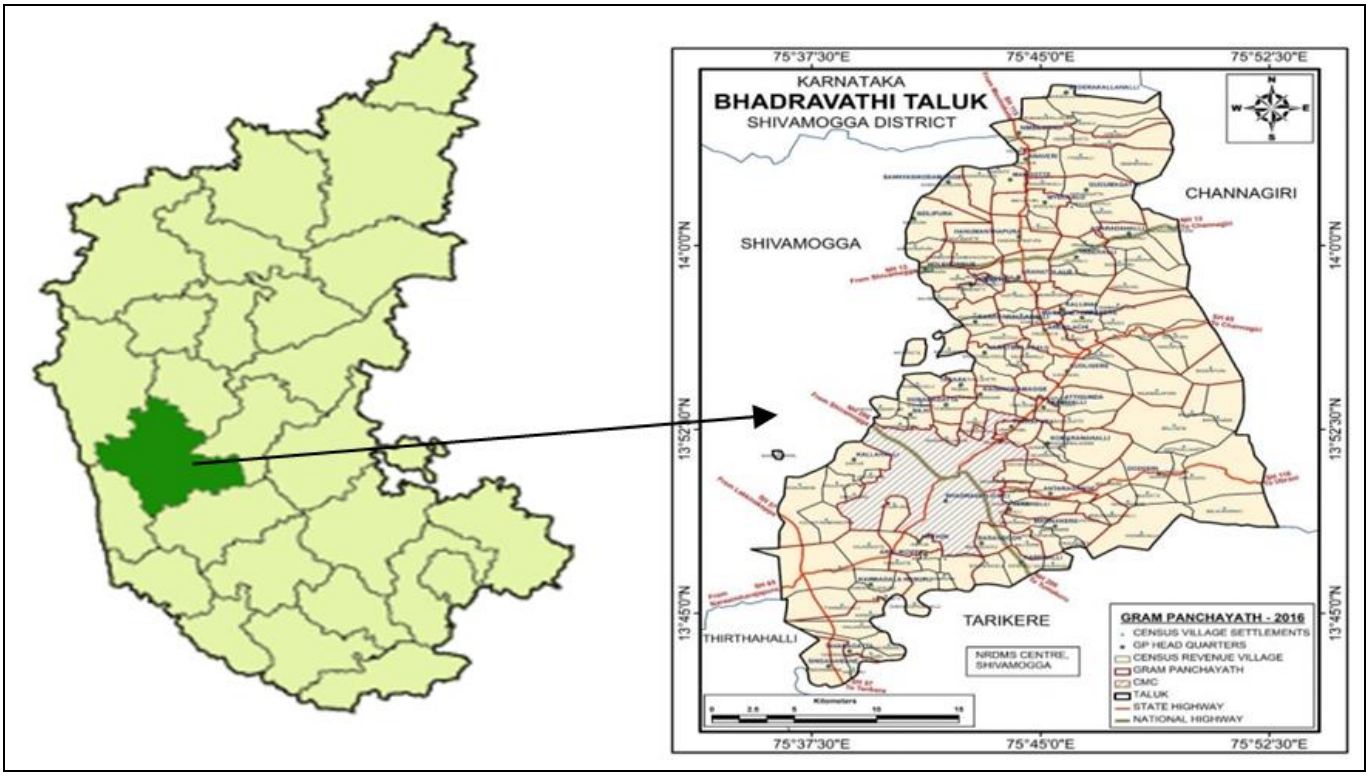

Fig 1: Bhadravathi taluk map (Source: shimoga.nic.in; en.wikipedia.org)

Collection of secondary data

The present review study was conducted by adopting the methodology of Jain (1989) [9]. A general survey of the plants was made and tried to observe different plants like herbs, shrubs and trees. The works of Chopra *et al*. (1956) [4], Kaushik and Dhiman (2000) [11], Mishra (1968) [15], Gamble 1915-1936; Sharma et al. 1984, 1988; Saldanha, 1996; Keshava Murthy and Yoganarasimhan (1990) [12]; Harish Kumar and Kiran (2015) [8]; Thirumala and Kiran (2017) [24] were referred.

Results and discussion

Weed flora

A total of 33 medicinal weed plants belonging to 21 families have been reported by Thirumala and Kiran (2017) [24]. Among 21 families Euphorbiaceae found to be dominant with 6 species followed by Amaranthaceae with 3 species and 2 species each in Asteraceae, Apocynaceae, Convolvulaceae, Solanaceae and Malvaceae respectively (Figure 2). The information regarding medicinal uses of plants reported are scrutinized with published literatures. However, their properties and active principles of plants should be standardized and tested for safe use. There is a wide range of weed vegetation being available in this area of Karnataka which have the ability to cure different kinds of diseases. A list of weed flora with their family, botanical name, frequency and parts used is presented in Table-1. It has been realize that therapeutic weeds play important role in future in ayurvedic medicinal value. These weed floras are used in the preparation of many medicines to cure different diseases. Now a days, the peoples move to ayurvedic medicines, which has no side effect and easily available with minimum rate by medical practitioner.

Edible and Wild Leafy Vegetables

Forty four (44) species belonging to 36 genera and 26 families of edible and wild leafy vegetable plants were recorded by Thirumala and Kiran (2017) [24]. They reported that Amaranthaceae family was dominant with 12 species followed by Fabaceae with 4 species and Poaceae, Asteraceae, Portulacaceae, Lamiaceae by 02 species each respectively. Remaining families consists of single species each. Figure 3 shows the number of edible and wild leafy vegetable plants in each family.

Roshan Adhikari et al. (2012) [18] reported that *Basellaalba* has been used from a long time back for the treatment of many diseases like dysentery, diarrhoea, anemia, cancer etc. It has also been utilized for different kinds of healing activities. The chemical composition of the leaf extract has been found to be: proteins, fat, vitamin A, vitamin C, vitamin E, vitamin K, vitamin B9 (folic acid), riboflavin, niacin, thiamine and minerals such as calcium, magnesium and iron. Some unique constituents of the plant are basellasaponins, kaempherol and betalain (Roshan Adhikari et al., 2012) [18].

Leafy vegetables are herbaceous, shrub where leaf is edible part, whose potential source of nutrition is currently undervalued / Nutrition is basic need of body. Green vegetables are occupied important place in diet due to this high nutritional value (Atram Seema, 2015) [2].

Flora like, *Amaranth* and *Basella*, contain oxalic acid. They should not be eaten on a regular basis without boiling and discarding the water. Plants containing oxalic acid should be cooked in a steel pot or pan, not in aluminum pots (Chenopodium giganteum, 2010) [3].

Many plants are adoptive and tolerant to adverse climatic factors.

Although, they can be raised comparatively at lower management cost even on poor marginal lands, they have remained underutilized due to lack of awareness and popularization of technologies for utilization. Now a days, underutilized foods are gaining importance as a means to increase the per capita availability of foods (Gowthami et al., 2016) [7]. Most of the wild leafy vegetables are seasonal

and they are consumed throughout the year. Peoples of this areas are consumed after cooking.

Fodder plants

Table 3 depict list of fodder yielding plants. A total of 47 fodder plants belonged to 27 families were recorded by Harish Kumar and Kiran (2015) [8]. Among the 27 families, 18 families are represented by single species and 3 families with 2 species each; 5 families are represented by 3 species each. Fabaceae (8 Species) was the dominant family followed by Moraceae, Poaceae, Malvaceae, Cyperaceae and Amaranthaceae with 3 species each.

In the ancient period, Indians have practiced mixed farming where livestock formed an integral part of agriculture. Rich genetic diversity exists for cultivated and rangeland species including tree, browse species, and herbaceous grasses and legumes. These plants besides many others form an integral part of feed and fodder resources of the country. The country is further endowed with the rich heritage of traditional know-how of raising, maintaining and utilizing forage, feed and livestock resources (Kalloo, 2015) [10]. In addition to fodder value, various plants also provide edible fruit, fuel wood, fibre, flowers, buds, vegetables, seeds, bee-forage, etc. Some plants are of crucial ethnobotanical importance and are brought into various uses, such as in curing of diseases, religious rituals and cultural Rites (Vir Singh et al., 2008) [27]. Singh *et al*. (1995) [23] and Singh and Bohra (2005) [22]. have given a list of 50 fodder trees, shrubs and non-graminaceous herbaceous plants occurring in mountain habitats. These fodder species occur in the agro-forestry systems or in the tree-dominated rangelands. Vir Singh et al. (2008) [27] recorded some 300 species of grasses, other herbaceous plants, trees and shrubs in the mid-altitude rangelands of Uttarakhand (India). Harish Kumar and Kiran (2015) [8] have recorded 47 species of fodder plants. Mound of dry paddy straw is stored and used as fodder. Ground nut oil cake, grains are stored in gunny bags and given to the livestock as a feed along with fodder plants.

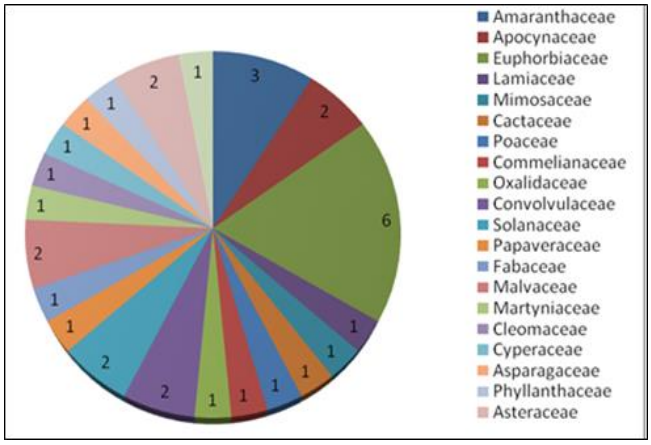

Fig 2: Number of weed flora in each family

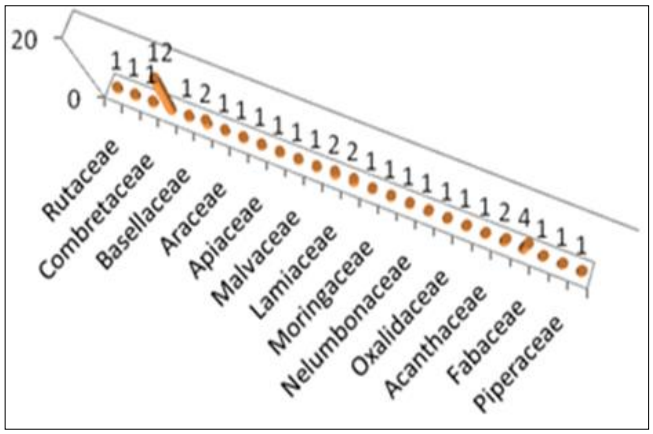

Fig 3: Number of Edible and wild leafy vegetable plants in each family

Table 1: Weed flora & their uses in Bhadra Resservoir Project area

SI. No.	Botanical Name	Family	Medicinal Uses
1	*Achyranthes aspera*	Amaranthaceae	Snakebite, skin diseases and piles.
2	*Calotropis gigantea*	Apocynaceae	Cough and dysentery
3	*Euphorbia hirta*	Euphorbiaceae	Cough, asthma, bronchitis and dysentery.
4	*Euphorbia tirucalli*	Euphorbiaceae	Ear ache and tooth ache.
5	*Jatropha curcas*	Euphorbiaceae	Wounds, swelling and skin diseases.
6	*Leucas aspera*	Lamiaceae	Insect repellent. Paste of whole plant is used to cure erysipelas.
7	*Mimosa pudica*	Mimosaceae	Cure piles.
8	*Opunita dillenii*	Cactaceae	Whooping cough & snakebite.
9	*Calotropis procera*	Apocynaceae	Remove kidney stones.
10	*Ricinus communis*	Euphorbiaceae	Cough.
11	*Tridax procumbens*	Asteraceae	Haemorrhage from cuts and wounds.
12	*Cynodon dactylon*	Poaceae	Piles and nasal bleeding.
13	*Alternanthera sp.*	Amaranthaceae	Ppneumonia.
14	*Commelina benghalensis*	Commelianaceae	Eeye acne.
15	*Oxalis corniculata*	Oxalidaceae	Dysentery. Fever and scurvey.
16	*Ipomea fistulosa*	Convolvulaceae	Abscess
17	*Datura metel*	Solanaceae	Cure asthma
18	*Argemone mexicana*	Papaveraceae	Burns, cuts and wounds
19	*Senna tora*	Fabaceae	Eczema, dysentery and diarrhoea.
20	*Sida cordata*	Malvaceae	Dysentery and diarrhoea
21	*Solanum nigrum*	Solanaceae	Jaundice and liver disorders.
22	*Helicteris isora*	Malvaceae	Gastric disorders.
23	*Martynia annua*	Martyniaceae	Epilepsy and sour throat
24	*Cleome viscosa*	Cleomaceae	Ear pain and antihelminthic
25	*Kirganelia reticulata*	Euphorbiaceae	Rheumatism and gout
26	*Cyperus rotundus*	Cyperaceae	Thirst, stomach disorders

27	*Asparagus racemosus*	Asparagaceae	Increasing milk of feeding mothers & diarrhoea
28	*Phyllanthus niruri*	Phyllanthaceae	Jaundice, psyrosis dyspepsia
29	*Amaranthus spinosus*	Amaranthaceae	Leprosy, bronchitis and piles
30	*Euphorbia geniculata*	Euphorbiaceae	Diarrhoea, dysentery, skin diseases, syphilis, wounds, pimples, vitiligo, skin diseases.
31	*Chromolaena odorata*	Asteraceae	Wounds, rashes, diabetes, insect repellent, antifungal and antibacterial properties
32	*Lantana camara*	Verbenaceae	Cancer, skin itches, leprosy, rabies, chicken pox, measles, asthma and ulcers
33	*Ipomea carnea*	Convolvulaceae	Anti-carcinogenic and oxytoxic properties.

Table 2: Edible and wild leafy vegetables with their scientific names & families

Sl. No	Scientific Name	Family
1.	*Achyranthes aspera*	Amaranthaceae
2.	*Alternanthera sessilis*	Amaranthaceae
3.	*Amaranthus spinosus*	Amaranthaceae
4.	*Amaranthus viridis*	Amaranthaceae
5.	*Amaranthus blitum*	Amaranthaceae
6.	*Amaranthus caudatus*	Amaranthaceae
7.	*Amaranthus cruentus*	Amaranthaceae
8.	*Amaranthus gangeticus*	Amaranthaceae
9.	*Amaranthus tricolor*	Amaranthaceae
10.	*Asparagus racemosus*	Asparagaceae
11.	*Alternanthera philoxeroides*	Amaranthaceae
12.	*Asterocantha longifolia*	Acanthaceae
13.	*Basella alba*	Basellaceae
14.	*Bambusa sp.*	Poaceae
15.	*Cassia tora*	Fabaceae
16.	*Commelina benghalensis*	Commelinaceae
17.	*Centella asiatica*	Apiaceae
18.	*Colocasia esculenta*	Araceae
19.	*Cynodon dactylon*	Poaceae
20.	*Cassia occidentalis*	Fabaceae
21.	*Celosia argentea*	Amaranthaceae
22.	*Eclipta alba*	Asteraceae
23.	*Eleocharis dulcis*	Cyperaceae
24.	*Ficus benghalensis*	Moraceae
25.	*Hibiscus cannabinus*	Malvaceae
26.	*Ipomea aquatica*	Convolvulaceae
27.	*Leucas aspera*	Lamiaceae
28.	*Moringa oleifera*	Moringaceae
29.	*Murraya koenigii*	Rutaceae
30.	*Marsilea quadrifolia*	Marsileaceae
31.	*Nelumbo nucifera*	Nelumbonaceae
32.	*Nymphaea nouchali*	Nymphaeaceae
33.	*Oxalis corniculata*	Oxalidaceae
34.	*Portuluca quadrifolia*	Portulacaceae
35.	*Portuluca oleracea*	Portulacaceae
36.	*Polygonum glabrum*	Polygonaceae
37.	*Piper nigrum*	Piperaceae
38.	*Solanum nigrum*	Solanaceae
39.	*Spinacia oleracea*	Amaranthaceae
40.	*Tamarindus indica*	Fabaceae
41.	*Terminalia bellerica*	Combretaceae
42.	*Trigonella foenum*	Fabaceae
43.	*Tridax procumbens*	Asteraceae
44.	*Vitex negundo*	Lamiaceae

(Source: Thirumala and Kiran, 2017)

Table 3: List of Fodder plants in Bhadravathi area (Source: Harish Kumar & Kiran, 2015)

Sl.No	Name of the species	Family
1.	*Acacia catechu*	Mimosaceae
2.	*Acacia sp.*	Mimosaceae
3.	*Ficus benghalensis*	Moraceae
4.	*Ficus religiosa*	Moraceae
5.	*Ipomea sp.*	Convolvulaceae
6.	*Morus alba*	Moraceae
7.	*Oxalis corniculata*	Oxalidaceae
8.	*Pongamia pinnata*	Fabaceae
9.	*Solanum sp.*	Solanaceae

10.	*Mangifera indica*	Anacardiaceae
11.	*Phyllanthus sp.*	Phyllanthaceae
12.	*Phoenix silvestris*	Arecaceae
13.	*Brassica sp.*	Brassicaceae
14.	*Zea mays*	Poaceae
15.	*Polygonum sp.*	Polygonaceae
16.	*Aegele marmelos*	Rutaceae
17.	*Butea monosperma*	Fabaceae
18.	*Dalbergia sisso*	Fabaceae
19.	*Holarrhaena antidysentrica*	Apocyanaceae
20.	*Lantana camera*	Verbenaceae
21.	*Moringa sp.*	Moringaceae
22.	*Crotalaria sp.*	Fabaceae
23.	*Cassia fistula*	Fabaceae
24.	*Cassia occidentalis*	Fabaceae
25.	*Citrus medica*	Rutaceae
26.	*Commelina benghalensis*	Commelinaceae
27.	*Sida acuta*	Malvaceae
28.	*Musa sp.*	Musaceae
29.	*Cynodon dactylon*	Poaceae
30.	*Cyperus rotundus*	Cyperaceae
31.	*Cyperus iria*	Cyperaceae
32.	*Cyperus difformis*	Cyperaceae
33.	*Hibiscus rosa*	Malvaceae
34.	*Oryza sativa*	Poaceae
35.	*Abutilon indicum*	Malvaceae
36.	*Achyranthus aspera*	Amaranthaceae
37.	*Amaranthus gracilis*	Amaranthaceae
38.	*Masilea sp.*	Marsileaceae
39.	*Bauhinia variegata*	Fabaceae
40.	*Bauhinia purpurea*	Fabaceae
41.	*Ricinus communis*	Euphorbiaceae
42.	*Euphorbia tirucalli*	Euphorbiaceae
43.	*Psidium guajava*	Myrtaceae
44.	*Momordica charantia*	Cucurbitaceae
45.	*Alternanthera sessilis*	Amaranthaceae
46.	*Leucas sp.*	Laminaceae
47.	*Terminalia chebula*	Combretaceae

Conclusion

Some plants are harmful to the crops and can dominate the vegetation if not cared for. Many of the weeds are useful for medicinal purposes. There is need for further investigation on these flora for active principle and to test their safety and efficacy so that it can be further utilized in health care needs. Sustainable management of these resources for the well-being of the local communities as well as to conserve biodiversity is of the utmost importance and could also contribute to preserve cultural and genetic diversity.

Uses of leafy vegetables provide seasonal, staple foods and important alternative to the agriculturally cultivated crops. Leafy vegetables are not only sources of food and nutrients to the local communities, but could also be means of income generation, if managed sustainably (Uprety et al., 2012 [26]; Prashanth Kumar and Shiddamallayya, 2014) [17]. Wild leafy vegetables always intake as food and they Posses good therapeutic value. So it is believed that these wild leafy vegetables contain some bioactive element. These wild leafy vegetable are used traditionally by people in householder hence, they have no or lesser side effect. A few plants are good to the livestock and cultivated as fodder with higher feed value. On this basis species of *Ficus*, *Alternanthera*, *Acacia*, *Cynodon* and grass species can be said as good fodders.

References

1. Aberoumand. A Studies on nutritional value of some wild edible plants from Iran and India. Pakistan J. of Nut 8, 2009, 26-31.
2. Atram Seema. Medicinal properties of wild leafy vegetables available in Maharashtra state in Rainy season. International Journal of Recent Scientific Research. 2015; 6(8):5875-5879.
3. Chenopodium giganteum". Retrieved, 2010, 11-03.
4. Chopra RN, Nayar SL, Chopra IC. Glossary of Indian Medicinal Plants. CSIR, New Delhi, 1956.
5. Gambhire VS, Biradar RM. Medicinal importance of some weeds of Aurangabad district, Maharashtra, India. Bioscience Discovery. 2016; 7(1):57-59.
6. Gamble JS. The Flora of the Presidency of Madras. 11 Parts. London: Adlard and Son Ltd. Repr. ed. 1967. Calcutta: Botanical Survey of India, 2017, 1915-1936.
7. Gowthami R, Prakash B, Raghavendra KV, Brunda SM, Niranjana KB. Survey of underutilized leafy vegetables in South Karnataka of India to attain nutritional security. Agri. Res & Tech:Open Access J. 2016; 1(5):1-6.
8. Harish Kumar, Kiran KBR. A Preliminary survey of fodder yielding plants of Bhadravati Taluk, Karnataka. International Journal of Multidisciplinary Research and Modern Education. 2015; 1(1):174-178.

9. Jain S.K. Botanical regions and flora of India. Everyman Science.1989; 24:213-223.
10. Kalloo G. Forage Research – New Dimensions. Indian Council of Agricultural Research, New Delhi. http://www.igfri.res.in, 2015.
11. Kaushik P, Dhiman AK. Medicinal plants and raw drugs of India. Bishan Singh Mehendra Pal Singh, DehraDun, 2000.
12. Keshava Murthy KR, Yoganarasimhan SN. Flora of Coorg (Kodagu) District, Bangalore: Karnataka.Vimsat Publishers, 1990.
13. Lefroy ECPR Dann JH Wildin, Wesley-Smith RN, McGowan AA. Trees and shrubs as sources of fodder in Australia. Agroforestry Systems. 1992; 20:117-139.
14. Legumes of the World Royal Botanic Gardens, Kew". www.kew.org. Retrieved, 2015, 09-29.
15. Mishra R. Ecology Workbook. Oxford and IBH Publishing Company, Calcutta, 1968.
16. Nagaraj Parisara, Kiran BR. Enumeration of Leafy Vegetables of Bhadravathi Taluk, Karnataka. International Journal of Scientific Research in Science and Technology. 2016; 2(1):32-35.
17. Prashanth Kumar GM, Shiddamallayya N. Documentation of wild leafy vegetables of Hassan district, Karnataka. International Journal of Pure & Applied Bioscience. 2014; 2(1):202-208.
18. Roshan Adhikari, Naveen Kumar HN, Shruthi SD. A Review on Medicinal importance of *Basella alba* L. International Journal of Pharmaceutical Sciences and Drug Research. 2012; 4(2):110-114.
19. Saldanha CJ. Flora of Karnataka, vols. 2. New Delhi: Oxford and IBH, 1996, 304 p.
20. Sharma, BD, Singh NP, Sundararaghavan R, Deshpande UR. Flora of Karnataka Analysis. Calcutta: Botanical Survey of India, 1984, 395 p.
21. Sharma BDS, Karthikeyan SK Mudaliar BG, Kulkarni S Moorthy. Additions to the Flora of Karnataka Analysis. Journal of Economic and Taxonomic Botany. 1987-1988, 11: 51-55.
22. Singh V, Bohra B. Livestock Feed Resources and Feeding Practices in Hill Farming Systems: a Review. Indian Journal of Animal Sciences, 2005, 75:121-127.
23. Singh V, Sharma RJ, Kumar A. Perspectives on the Utilization of Forest Fodder in the Mountains. In Singh V Sharma, RJ Kumar. A. (eds.) Ecological Carnage in the Himalaya. IBD, Dehradun, 1995.
24. Thirumala S B R. Kiran, Medicinal Importance of Some Weed Flora of BR Project Area, Karnataka", International Journal of Advanced Trends in Engineering and Technology. 2017; 2(1):111-114.
25. Thirumala S, B R Kiran. Preliminary Survey of Edible and Wild Leafy Vegetables of Bhadra Reservoir Project Area, Karnataka", International Journal of Current Research and Modern Education. 2017; 2(2):4-6.
26. Uprety Y, Poudel R, Shrestha KK, Rajbhandary S, Tiwari NN, Shrestha UB, *et al.* Diversity of use and local knowledge of wild edible plant resources in Nepal, J.of Ethno. & Ethnomedi. 2012; 8(16):1-16.
27. Vir Singh, RD Gaur, Babita Bohra. A Survey of Fodder Plants in Mid-altitude Himalayan Rangelands of Uttarakhand, India. Journal of Mountain Science. 2008; 5:265–278.
28. Wilson AD. A review of browse in the nutrition of grazing animals. J Range Man. 1969; 22:23-28.
29. http://www.bhadravathicity.gov.in/
30. www.en.wikipedia.org.