



Herbal Dye Yielding Plants of District Kathua, Jammu And Kashmir State, India

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Abstract

District Kathua laying at 32°-17' N to 32°-55' N latitude and 75°-7' E to 74°-10' E longitude is known as gateway of JandK and exhibit marked variation in topography coupled with altitudinal range and climate. The area is characterised by varied type of vegetation. Survey of literature revealed that work has been done on ethno botany and plant diversity of Jammu and Kashmir as well as the study area but enlisting of dye yielding plants has been done for one district only. Therefore the purpose of the present study was to document the dye yielding plant species and associated knowledge from the study area. 64 dye yielding plant species belonging to 43 families were reported from the study area. The correct identity of reported plant species along family, vernacular name, habit and part used has been documented in the present work. A wealth of plant resources for natural dyes exists in the study area but most of it is underutilised. Present work is aimed to open new ways for future studies on various aspects of reported taxa and initiate extensive exploration in other districts of the state.

Keywords: Dye yielding plants, Kathua, Ethnobotany, Herbal dye.

Introduction

Herbal dyeing in an ancient and attractive practice, full of surprises, as you never know what colour you are going to get. It depends on the freshness and concentration of pigments in plant materials. Plant parts used in the preparation of dyes include leaves, bark, fruits, roots, rhizomes, wood, seeds, gum and sometimes whole of the plant is used for the extraction. The earliest surviving evidence of herbal dyeing comes from a 5,000 years old piece of cloth coloured with madder (*Rubiaceae*) discovered at Mohenjodaro¹. About 1500 plant taxa are used for dyeing in the world² and nearly 150 dye yielding plants have been able to compete with synthetic dyes³.

The ethnic groups inhabiting different areas of the state have evolved various methods for utilising the available plant resources as colouring agents. Organic dyeing is safer as researchers have reported the release of harmful chemicals that are injurious to human health from synthetic dyes and this has led to an increased interest of people in herbal dyes and their awareness for health and environmental concerns associated with synthetic dyes. Significant work has been done on ethno botany in the state but dye yielding plants of only one district have been reported so far except a few casual references^{2,3}. Many workers have studied various aspects of ethno botany and plant diversity of Jammu and Kashmir⁴⁻²⁵. The present work is first comprehensive account of the herbal dye yielding plants of the study area and it is an attempt to gather information on traditional knowledge system associated with use of natural dyes by Gujjar, Bakerwal and Gaddi tribes and others in the study area.

Material and Methods

District Kathua, the gateway of Jammu and Kashmir state is bounded by Gurdaspur district of Punjab in south, Chamba district of Himachal Pradesh in east, Doda, Udhampur and Samba districts in North and Pakistan in west. The district lies between 32°-17' N to 32°-55' N latitude and 75°-7' E to 74°-10' E longitude covering an area of 2651 sq. km. with altitude ranging from 244m in plains to 4700m in higher reaches of Bani. District Kathua comprises of 5 tehsils and 8 blocks. The present communication is an outcome of extensive survey of district Kathua undertaken during 2010 to 2013. Survey was conducted in all the tehsils including remote tribal villages and forests occupied by Gujjar Bakerwal tribes. Experienced elderly community members, gujjars, bakkarwals, livestock rearers were interviewed for their detailed valuable knowledge on specific plants used in traditional colouring practices. The information collected was systematically documented and analysed. The plant material was collected, dried and was used for making voucher specimen deposited with Herbarium Department of Botany, University of Jammu.

Results and Discussion

64 plant species belonging to 60 genera and 43 families were reported from the study area. Ceasalpiniaceae was the most dominant with 4 dye yielding plant species, followed by Euphorbiaceae, Fabaceae, Malvaceae, Rosaceae and Solanaceae with 3 dye yielding species and Anacardiaceae, Asteraceae, Combretaceae, Lythraceae, Mimosaceae, Moraceae, Myrtaceae

and Rutaceae with 2 species each. All the remaining families were represented by a single species. Leaves of 18 plant species, fruits of 19 plant species, bark of 17 plant species, flowers of 12 plant species, roots of 7 plant species, seeds of 4 plant species, wood of 2 plant species and rhizome of one plant species were found in use as source of colouring materials. There were 25

species with more than one plant part in use. Trees (31) were found to be most dominant taxa, followed by herbs (16), shrubs(14) and climbers (3). Most of the families were of class dicotyledons (36), followed by monocotyledons (5) and gymnosperms (2).

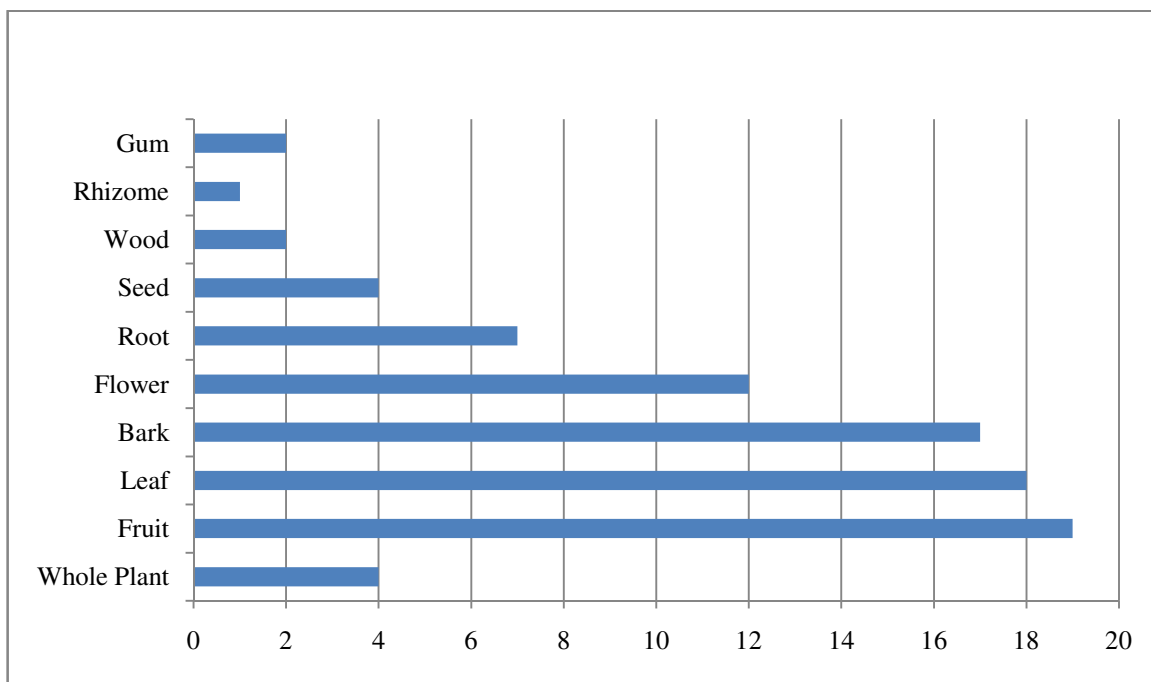


Figure-1
 Dye yielding plant part representation

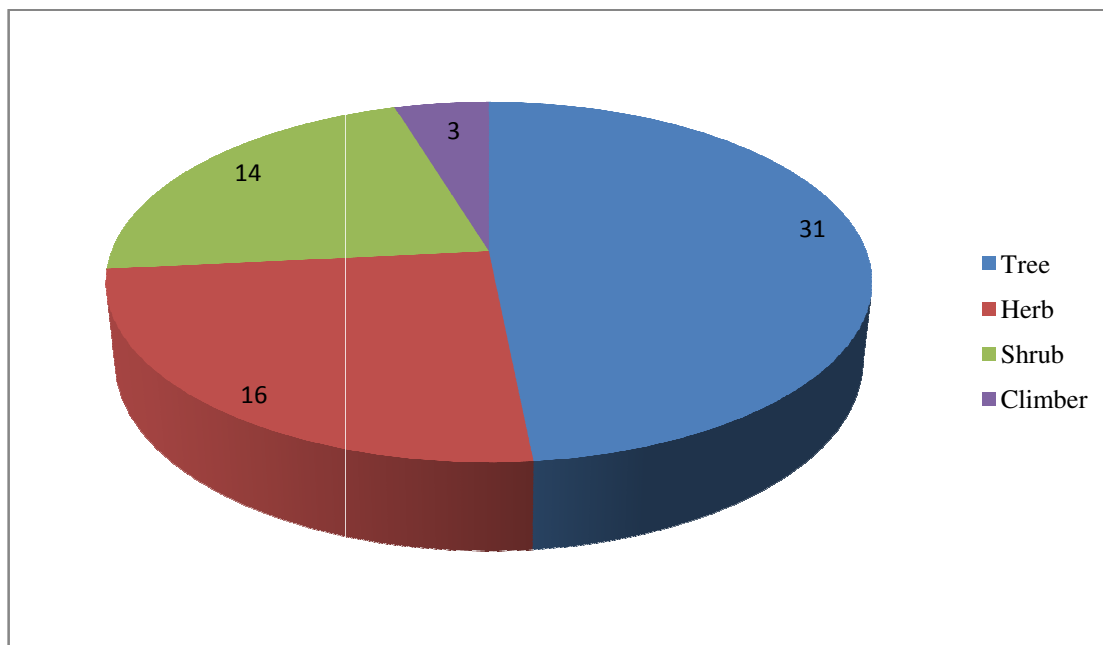


Figure-2
 Habit of the dye-yielding plant species in district Kathua, JandK

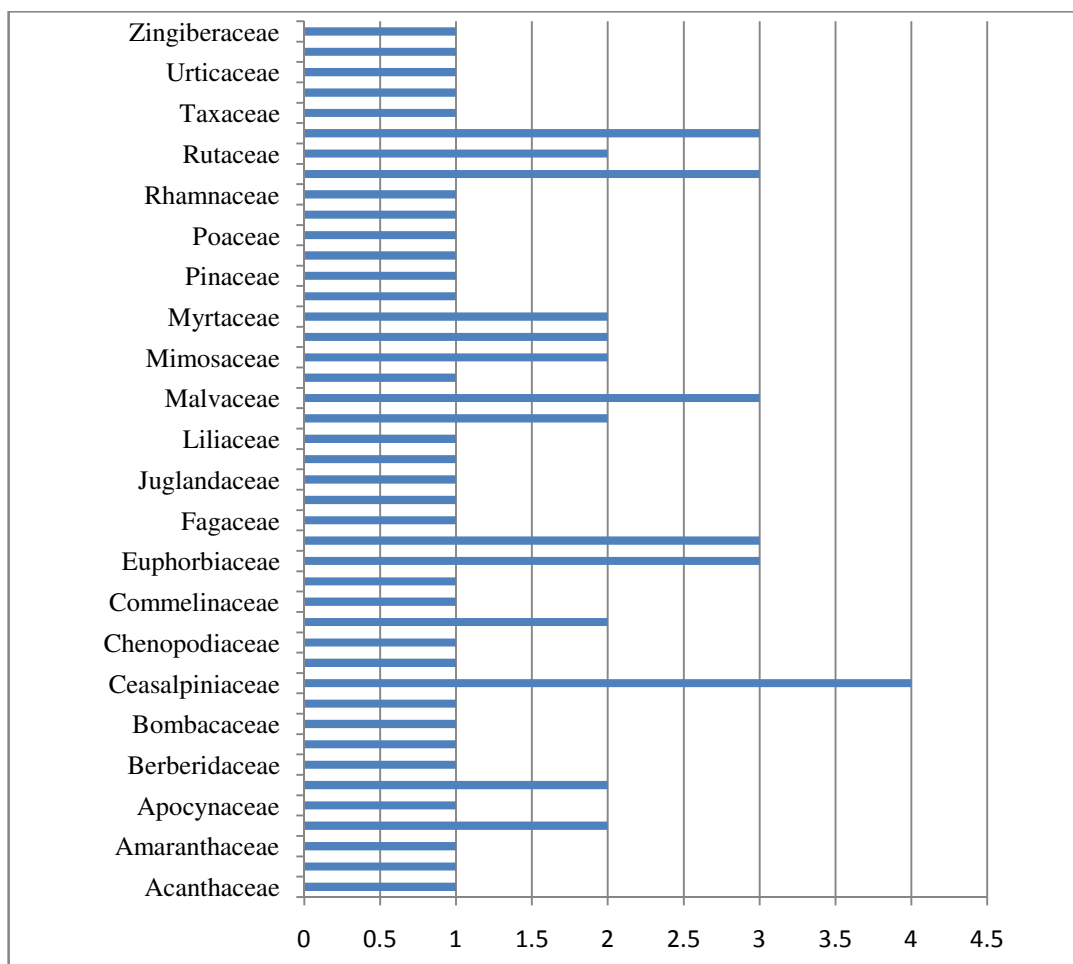


Figure-3
Family wise representation of dye yielding Taxa of district Kathua

Local people of the study area are engaged in extraction, processing and preparation of natural dyes using plant parts like leaves, fruits, bark, flowers and rhizomes etc. Most of the rural people use crude methods for extraction of dye. They prefer to dye yarn by boiling flowers, bark, wood or rhizomes in water. Dried flowers and fruits are used to prepare colours for decorating walls of their houses. Flowers of *Woodfordiafruticosa* are boiled to get a Red-yellow dye which is used for colouring ropes made up of *Crotolariajuncea*. Most of the people prefer Mehandi (*Lawsoniainermis* L.) as hair dye and for colouring hands in wedding ceremonies instead of synthetic ones. Paste of Haldi (*Cucurma longa*) is applied in wedding rituals to colour the couple. Festival Holi was played with natural colours in ancient times and even now they are preferred over synthetic colours due to their eco-friendly nature.

To extract dye from roots, stem or bark, the plant material is crushed, soaked in water for 36 hours and then boiled. After filtration the extract is concentrated by repeated heating. The floral parts and leaves when used for dye are crushed and dissolved in water for 2 days followed by heating to concentrate the solution and in case of fruits, juice is obtained by squeezing

andwater is added. The solution is then kept in iron vessel for 2-3 days to obtain the dye after filtration.

In one indigenous dye extraction process fresh flowers of *Buteamonosperma* are washed and placed in water. 2 tablespoon of turmeric powder is also added. Flowers are dipped in the same water for 72 hours. The whole content is gently heated to concentrate the solution. The mixture is then filtered by using cotton cloth, the exudate act as a dye for colouring textile.

In another process leaves of *Adathodavasica* and *Morusalba* are dried for two days (not sun dried). They are crushed and put in an earthen pot to which water is added. The pot is kept as such for 5 days. The content is then boiled to get a thick liquid and extract is filtered by using a cloth or sieve to yield natural dye. A little vinegar is added later on which act as mordant.

In yet another process dried fruits of *Emblicoefficialis* and *Sapindustrifoliatus* are mixed in equal proportions and finely crushed. This solution is then boiled for long hours. The boiled mixture is then filtered. The collected thick black liquid act as hair care dye. It makes the hair look black and shiny. Fruits of

Terminaliachebula and bark of *Terminaliaarjuna* is dried, crushed and boiled to obtain a black dye used for colouring textiles, ropes and mats etc.

The inhabitants of study area exhibit variety of dye yielding resources and usage pattern. Use of dyes in various fabrics, food, beverages, rituals and festivals reflects close affinities of local people with the dyeing art. In recent times herbal dyes have increased their demands and there is an urgent need to promote production of natural dyes. Dye resources could be supportive to concerned industries and to the rural folk as well.

An enumeration of the reported dye yielding plant species including family name, vernacular name, habit, part used and colour produced is given in table 1.

Conclusion

Dye yielding plants are of considerable interest on account of their multiuse potential and environmental friendly nature. A treasure of dye yielding plant diversity exists in Jammu and Kashmir but region wise mapping of the available plant diversity has not been done so far. It is the need of hour to rely on herbal dyes and replace synthetic dyes completely to save environment and ecology of our fragile habitats. The attraction of natural dyes has been increasing despite of many difficulties in procuring the plant resources, colouring defects and requirement of mordant's. Industrialists and local forest dwellers both can contribute in this venture by joining hands. Various types of mordant's like lemon juice, sugar solution, animal urine, wood ash and vinegar etc. are used by locals to develop a bond between the dye and material to be coloured. The traditional knowledge related to dye yielding plants is confined only to the surviving elderly community members and only few of them pass it to next generation. No serious attempts have been made in J and K to document and preserve traditional knowledge confined with the indigenous people and it is high time to rescue them from being lost forever. Commercialisation of some of the natural dyes can be helpful to rural people of the state for enhancing their economy through systematic approaches and scientific inputs for proper utilisation and conservation of dye yielding plant resources.

References

1. Mahanta D. and Tiwari S.C., Natural dye-yielding plants and indigenous knowledge on dye preparation in Arunachal Pradesh, northeast India, *Curr. Sci.* **88(9)**, 1474-1480 (2005)
2. Umbreen S., Ali S., Hussain T. and Nawaz R., Dyeing properties of natural dyes extracted from turmeric and their comparison with reactive dyeing, *Res. J. Tex. App.* **12(4)**, 1-11 (2008)
3. Singh K. and Mathur P.K., Traditional dye yielding plants of Ferozabad, U.P., India, *Jour. Adv. Lab. Res. Bio.*, **3(2)**, 115-118 (2012)
4. Kant S. and Dutt H.C., Dye-yielding plants of Neeru catchment in Doda, JandK. India, *Ethnobotany*, **17**, 197-199(2005)
5. Rashid A., Dye yielding plant diversity of District Rajouri, Jammu and Kashmir state-India, *Int. J. Pharm. Bio sci.*, **4(1)**, 263-266 (2013)
6. Abrol B.K. and Chopra I.C., Some vegetable drug resources of Ladakh, *Curr. Sci.*, **31**, 324 (1962)
7. Being S.Y., Nawchoo I.A. and Iqbal. M., Traditional veterinary medicine among the tribes of Kashmir Himalaya, *Jour. of Herbs, Species and Medicinal Plants.*, **10(4)**, 121-127 (2003)
8. Dar G. H., Virjee, Kachroo P. and Buth G.M., Ethnobotany of Kashmir-1 Sind valley, *Jour. Economy Taxonomic Botany.* **5**, 668-675(1984)
9. Kant S. and Dutt H.C., Dye-yielding plants of Neeru catchment in Doda, JandK. India, *Ethnobotany*, **17**, 197-199 (2005)
10. Kaul M.K., Sharma P.K. and Singh V., Ethnobotanic studies in north-west and trans Himalaya IV. Some traditionally used tea substitutes from Jammu and Kashmir, *Him. Plant. Jour.* **4**, 23-28 (1986)
11. Kaul M.K., Sharma P.K. and Singh V., Ethnobotanic studies in north-west and trans Himalaya, *Jour. health sci.*, **16**, 81-87 (1990)
12. Kaul M. K., Medicinal plants of Kashmir and Ladakh, Indus publishing company, New Dehli, (1997)
13. Khan M., Structural and compositional Analysis of Phytodiversity of Sewa River Catchment Area in Northwest Himalaya (2007)
14. Kirn H.S., Kapahi B.K. and Srivastava T.N., Non-Timber forest wealth of Jammu and Kashmir State (India), *Plant Jour. of Non-Timb. For. Prod.*, **6(1 and 2)**, 1-18 (1999a)
15. Kirn H.S., Kapahi B.K. and Srivastava T.N., Ethnobotanical observation on the gymnosperms of Poonch district (JandK State) India, *J. Econ. Tax. Bot.*, **23(1)**, 155-160 (1999b)
16. Kirn H.S. and Kapahi B.K., Ethno-botanical notes on some fern and fern allies of Jammu and Kashmir state, India, *Indian Fern Jour.* **18**, 35-38 (2001a)
17. Kirn H.S., Kaphi B.K. and Srivastva T.N., Non Timber Forest Wealth of Jammu and Kashmir State-II, Medicinal Plants, *Jour. of Non-Timber Forest Products*, **4**, 8-42 (2001a)
18. Koul M.L., Some aspects of research on medicinal plants of India, *Eastern Pharmacist*, 25-29 (1971)

Table-1
Plant species being used and having potential in yielding natural dyes in district Kathua, Jand K

S. No.	Botanical Name	Vernacular Name	Habit	Dye yielding plant part	Colour produced
	Acanthaceae				
1	<i>Adathodavasica</i> Nees.	Brainkad	Shrub	Leaves	Green
	Alliaceae				
2	<i>Allium cepa</i> L.	Ganda, Piyaz	Herb	Leaves, Fruit	Yellow, Brown, Bright Red
	Amaranthaceae				
3	<i>Achyranthesaspera</i> L.	Puthkanda	Herb	Whole plant	Black
	Anacardiaceae				
4	<i>Lanneacoromandelica</i> (Houtt.) Merr.	Kaimbla	Tree	Bark, Resin	Yellow-Brown
5	<i>Mangifera indica</i> L.	Amb	Tree	Bark, Leaves	Black
	Apocynaceae				
6	<i>Nerium indicum</i> Mill.	Lalgandira	Shrub	Roots, Bark	Black
	Asteraceae				
7	<i>Tagetes erecta</i> L.	Genda	Herb	Flowers	Yellow
8	<i>Tagetes minuta</i> L.	Bann Gutti	Herb	Flowers	Yellow
	Berberidaceae				
9	<i>Berberis lycium</i> Royle.	Kavelli	Shrub	Roots	Yellow
	Betulaceae				
10	<i>Betula utilis</i> D. Don	Burj	Tree	Tree gum	Brown
	Bombacaceae				
11	<i>Bombax ceiba</i> L.	Simbal	Tree	Flowers	Red
	Brassicaceae				
12	<i>Brassica oleracea</i> L. var. capitata L.	Gobhi	Herb	Leaves	Pink
	Cesalpiniaceae				
13	<i>Bauhinia variegata</i> L.	Kaliyad	Tree	Flowers	Purple
14	<i>Cassia fistula</i> L.	Karongal	Tree	Bark, Pods	Brown, Black
15	<i>Cassia tora</i> L.	Loki Haedma	Shrub	Seeds	Black
16	<i>Tamarindus indica</i> L.	Imbli	Tree	Leaves, Pods	Reddish-yellow
	Cassuarinaceae				
17	<i>Cassuarinaequisitifolia</i> Forst.	Jahbuko	Tree	Bark	Light Reddish
	Chenopodiaceae				
18	<i>Beta vulgaris</i> L.	Chakundar	Herb	Roots	Red
	Combretaceae				
19	<i>Terminalia arjuna</i> (Roxb. ex DC.)	Arjan	Tree	Bark	Light brown
20	<i>Termaniliabellirica</i> (Gaerth.) Roxb.	Bahera	Tree	Fruits	Blue
	Commelinaceae				
21	<i>Commelinabenghalensis</i> L.	Churra	Herb	Leaves, Flower	Blue
	Datisacaceae				
22	<i>Datisacacannabina</i> L.	Bujr pang	Shrub	Roots	Yellowish- red
	Euphorbiaceae				
23	<i>Emblicoefficialis</i> Gaerth.	Amla	Tree	Fruit, Bark	Dark red
24	<i>Euphorbia helioscopia</i> L.	Doodhli	Herb	Whole plant	Yellow
25	<i>Mallotus philippensis</i> (Lam.) Muell-Arg.	Kameela	Tree	Fruits	Red-orange
	Fabaceae				
26	<i>Abrus precatorius</i> L.	Ratti	Climber	Seeds	Black
27	<i>Buteamonosperma</i> (Lam.) Kuntze	Palah	Tree	Flowers	Yellow-orange
28	<i>Indigofera tinctoria</i> L.	Neeli	Shrub	Leaves, Pods	Indigo
	Fagaceae				
29	<i>Quercus leucotrichophora</i> A. Camus.	Rhien	Tree	Bark	Yellowish brown

S. No.	Botanical Name	Vernacular Name	Habit	Dye yielding plant part	Colour produced
	Geraniaceae				
30	<i>Geranium napalense</i> Sweet	Banda	Herb	Root	Red
	Juglandaceae				
31	<i>Juglans regia</i> L.	Akhrot	Tree	Bark, Unripe fruits	Brown, Black
	Lamiaceae				
32	<i>Mentha longifolia</i> (L.) Hudson	JangliPutna	Herb	Whole plant	Dark Green
	Liliaceae				
33	<i>Aloe barbedensis</i> Mill.	Kawargandal	Herb	Whole plant	Red
	Lythraceae				
34	<i>Lawsonia inermis</i> L.	Mehndi	Shrub	Leaves	Yellow-orange
35	<i>Woodfordia fruticosa</i> (L.) Kurz.	Dhai	Shrub	Flower, Leaves	Red-yellow
	Malvaceae				
36	<i>Alcea rosea</i> L.	Gulkhaida	Herb	Flowers	Red
37	<i>Hibiscus rosasinensis</i>	Gulhar	Shrub	Flowers	Red
38	<i>Morus alba</i> L.	Toot	Tree	Leaves	Yellow
	Meliaceae				
39	<i>Toonaciliata</i> M. Roem	Tunu	Tree	Flower, Seed, Leaves	Yellow, Red
	Mimosaceae				
40	<i>Acacia catechu</i> (L.f.) Willd.	Khair	Tree	Bark, Wood	Dark brown
41	<i>Acacia nilotica</i> (L.) Willd. Ex Del.	Babool	Tree	Fruit rind, gum	Black
	Moraceae				
42	<i>Artocarpus heterophyllus</i> Lam.	Kathal	Tree	Fruits, Wood	Yellow
43	<i>Ficus religiosa</i> L.	Pipal	Tree	Bark	Reddish, Pale brown
	Myrtaceae				
44	<i>Psidium guajava</i> L.	Amrood	Tree	Fruits	Black-brown
45	<i>Syzygium cumini</i> (L.) Skeels	Tallan	Tree	Bark, Fruits	Black, Purple
	Oxalidaceae				
46	<i>Oxalis corniculata</i> L.	Imbli	Herb	Leaves, Flower	Yellow, Orange, Red, Brown
	Pinaceae				
47	<i>Pinus wallichiana</i> A.B. Jackson	Kail	Tree	Bark	Black
	Piperaceae				
48	<i>Piper betle</i> L.	Paan		Leaves, Root	Blue
	Poaceae				
49	<i>Hordeum vulgare</i> L.	Joun	Shrub	Leaves	Yellow, Red
	Punicaceae				
50	<i>Punica granatum</i> L.	Anaar	Tree	Flower, Fruit	Yellow-red, Deep blue, Black
	Rhamnaceae				
51	<i>Ziziphus jujuba</i> Mill.	Barie	Tree	Fruit	Reddish pink
	Rosaceae				
52	<i>Prinsepia utilis</i> Royle.	Bekkra, Cherara	Shrub	Fruit	Deep purple
53	<i>Prunus persica</i> Batsch	Aaru	Tree	Leaves, Bark, Fruit	Grey, Green, Yellow
54	<i>Pyrus pashia</i>	Nashpati	Tree	Fruit	Black
	Rutaceae				
55	<i>Aegle marmelos</i> (L.) Correa ex Roxb.	Bael	Tree	Fruit	Yellow
56	<i>Citrus medica</i> L.	Kimb	Tree	Bark	Blue
	Solanaceae				
57	<i>Capsicum annum</i> L.	Mirch	Shrub	Leaves, Fruit	Yellow, Red
58	<i>Nicotiana tabacum</i> L.	Tambaku	Herb	Leaves	Green, Brown

S. No.	Botanical Name	Vernacular Name	Habit	Dye yielding plant part	Colour produced
59	<i>Solanumnigrum</i> L.	Kayankothi	Herb	Seed	Black
	Taxaceae				
60	<i>Taxusbaccata</i> L.	Barmi	Tree	Bark	Red
	Thymeliaceae				
61	<i>Daphne papyracea</i> Wall. Ex Stend.	Muhtattasangulu	Shrub	Bark, Fruits	Dark Red
	Urticaceae				
62	<i>Urticadioeca</i> L.	Bichubutti	Shrub	Roots	Brown, Black
	Vitaceae				
63	<i>Vitisvinifera</i> L.	Aangur	Climber	Leaves	Green
	Zingiberaceae				
64	<i>Cucurma longa</i> L.	Haldi	Herb	Rhizomes	Yellow

19. Koul M.K., High altitude botanicals in integrative medicine-Case studies from Northwest Himalaya, *Indian Jour. of Traditional Knowledge* ,**9(1)**,18-25 (2010)
20. Rashid A., Anand V.K. and Shah A.H., Plant Resource Utilization in the Ethno veterinary Practices by the Gujjar and Bakarwal Tribes of Jammu and Kashmir state, India, *Jour. Phytol. Res.*, **2**,293-298 (2007)
21. Rashid A., Anand V.K. and Sarwar J., Less Known wild edible plants used by the Gujjar Tribe of district Rajouri, Jammu and Kashmir state-India, *Int. Jour. of Botany*, **4 (12)**, 219-224 (2007)
22. Rashid A. and Anand V.K., Medicinal plant biodiversity in India: Resource utilization and conservational aspects, *Environment Conservation Journal*, **9(1and2)** 59-66 (2008)
23. Sharma P.K. and Singh V., Ethno-botanical studies in north-west and trans Himalaya- V. Ethno-veterinary medicinal plants used in Jammu and Kashmir, India, *J. Ethno pharmacology*, **27**, 63-70 (1989)
24. Srivastava T.N., Kapahi B.K., Kirn H.S. and Sarin Y.K., Threatened plants of medicinal and aromatic value of North Western Himalaya, *Jour. Non-Timber Forest Products*, **7(3/4)**, 165-179 (2001)
25. Strerwart RR., An annotated Catalogue of Vascular Plants of West Pakistan and Kashmir, Fakhri Press Karachi, Pakistan (1972)
26. Swami A. and Gupta B., Flora of Udhampur district, Bishen Singh Mohinder (1998)
27. Wani P.A., Dar A.R., Mohi-ud-din G.G., Ganaie K.A., Nawchoo I.A. and Wafai B.A., Treasure and Tragedy of the Kashmir Himalaya, *Int. Jour. of Botany*, **2(4)**, 402-408 (2006)