



## DYE YIELDING PLANT DIVERSITY OF DISTRICT RAJOURI, JAMMU AND KASHMIR STATE-INDIA

ABDUL RASHID\*

*Earth Foundation International, 110, Poonch House Talab Tillo- Jammu (J&K) India-180002*

*Email: rashid@earthfi.org*

### ABSTRACT

District Rajouri laying at 30° – 50' N to 33° – 30' N longitude and 74° E to 74° – 10' E latitude, with diverse climatic conditions and varying altitudinal zones (490-4700 m.) exhibit a great degree of plant diversity. Survey of the literature revealed that many authors have contributed to ethnobotany and plant diversity studies of the Jammu and Kashmir state but the enlisting of dye yielding plant diversity has not been done so far. Therefore the purpose of the present study was to document the dye yielding plant diversity and associated knowledge from the study area. Forty-eight dyes yielding plant species belonging to twenty-seven families were reported from the study area. The botanical identity of the reported plant species with family, local name, habit and part used has been documented in present work. The study revealed that a considerable plant resource base for natural dyes exists in the study area but remained in the wild and unutilised for this purpose. The present work has opened up a new window for the future studies on the various aspects of the reported taxa including extensive exploration for updating of the present list and to study the conservational aspects of the disappearing flora of the region.

**KEY WORDS:** Natural Dyes, Dye yielding plants, Plant diversity, Rajouri, Ethnobotany.

### INTRODUCTION

Dyes are the natural or synthetic compounds used to add a colour to or change the colour of materials. Dyes are capable of being fixed to materials and do not wash out with detergents and water or fade easily on exposure to light. The majority of natural dyes are made from plant parts such as leaves, flowers, roots, berries, bark, rhizomes, tubers, shoots, sap and wood. Textile dyeing dates back to the Neolithic period. Throughout history, people have been using natural dyes for their textiles and other materials like lather, cosmetics, and inks etc using common, locally available materials, mostly plants. Chinese have recorded the use of dyestuff even before 2600BC<sup>1</sup>. In ancient times, the 'Holi' festival in India was played with flower petals or with natural colours obtained from different plant parts<sup>2</sup>. The 'Holi' festivals were quite safe with natural colours but with the advent of synthetic colours a great harm is often caused to the human body and environment. These days' cheaper chemical dyes are readily available in the market as alternative of natural dyes. These synthetic chemicals create different health hazards like skin allergies, respiratory problems, cancer, kidney and liver diseases. They also pose a bigger environmental challenge and disrupt the normal ecological processes. Herbal dyes were used to colour the textiles and other stuff across the world up to the mid of the 18<sup>th</sup> century. William Henry Perkin, an English chemist in 1856 discovered a synthetic colouring compound called mauveine, which became popular overnight and slowly replaced the herbal and other natural dyes. Today only a small percentage of textiles and paper is dyed with natural colours. Recently, there has been an increasing interest in the herbal dyes as the consumers have become aware of the ecological and health related problems associated with the synthetic dyes<sup>3</sup>. Health and environmental concerns associated with synthetic dyes have once again brought the light back to the natural dyes yielding bio-resources, mainly plants. Significant work on ethnobotany has been done during the last few decades in India.

Although much has been published from the various parts of the country, yet Jammu and Kashmir lagged behind. However many workers have made note able contributions to the ethnobotany of the state. But none of the below or anyone else has made a detailed account of the dye yielding plant diversity of Jammu and Kashmir used by the local inhabitants, except a few casual references. Many workers<sup>4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,824</sup> studied various aspects of the ethnobotany and plant diversity of Jammu and Kashmir State. The present work is the first comprehensive account of the dye yielding plant diversity of the study area being consumed by the local inhabitants. The present study is an attempt to overcome the paucity of documented traditional knowledge of the Gujjar-Bakerwal tribe and others living in the study area about the dye yielding plant diversity and is bound to prove handy for the phytochemists, naturalists and industries interested in developing alternative plant based dyes.

### MATERIALS AND METHODS

Rajouri is one of the hilly districts of Jammu and Kashmir State bounded by district Poonch in North, district Jammu in South, District Udhampur in East and PoK (Mirpur) in the West. The district lies between 30° – 50' N to 33° – 30' N longitude and 74° E to 74° – 10' E latitude, covering an area of 2630 km<sup>2</sup> with an altitudinal variation of 490 meters in Sunderbani to 4700 meters in Pir Panjal ranges. District Rajouri has six tehsils and nine blocks with four small towns, having urban area of 18 km.<sup>2</sup> (Figure.No.1.) The present work is the outcome of extensive survey of district Rajouri undertaken during 2008 and 2011. Field surveys were undertaken in the remote tribal villages and forests areas inhabited by the Gujjar-Bakewal tribe. Old and experienced men and women were interviewed for the first hand

information on specific plants used in traditional colouring practices. The informers were also shown collection of specimens for reconfirmation of the information. Repeated and cross queries were done to confirm and verify the information. The information collected was systematically documented and analysed. The plant material was collected, dried and was used for making the Voucher Specimen deposited with the Herbarium of department of Botany, University of Jammu. Plant specimens were identified using related literature as standard references<sup>25,26,27</sup>.

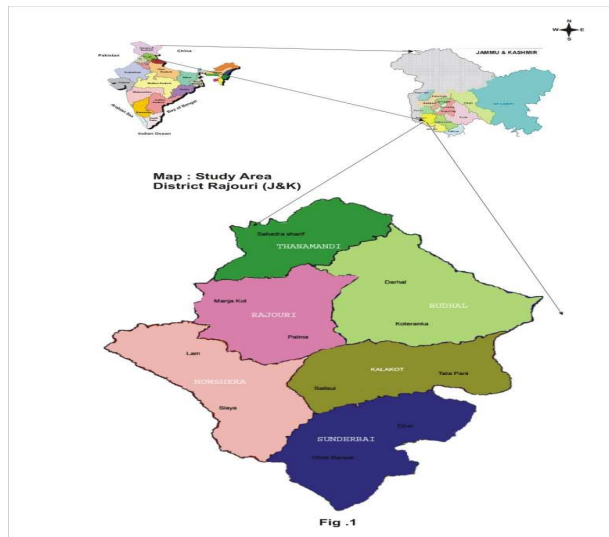


Figure. No.1. Map of the Study Area.

**RESULTS**

Forty eight plant species belongs to forty genera and twenty seven families were reported from the study area. Asteraceae, Fabaceae and Rosaceae were the most common used families with five elements each followed by Caesalpiniaceae with 4 species, Balsaminaceae 3 specie, Anacardiaceae, Berberidaceae, Euphorbiaceae, Lythraceae and Polygonaceae with 2 speies each. All the remaining 17 families, Acanthaceae, Ericaceae, Fagaceae, Geraniaceae, Juglandaceae, Liliaceae, Malvaceae, Meliaceae, Mimosaceae, Moraceae, Pinaceae, Rhamnaceae, Rubiaceae, Taxaceae, Thymelaeaceae, Urticaceae and Zingiberaceae represents a single species each. Flowers of twelve plant species, roots of eight plant species, leaves of thirteen plant species, seeds of three plant species, shoots of three plant

species, fruits of six plant species, Bark of eight plant species, wood of two plant species and rhizome of one plant species were found in use of the locals for colouring purposes. There were six species with more than one plant part in use. A description of the reported dye yielding plant species including family name, local name, habit and part used is given in the Table. No. 1. Trees (22) dominate the reported plant species followed the shrubs (13), Herbs (12) and only one climber.

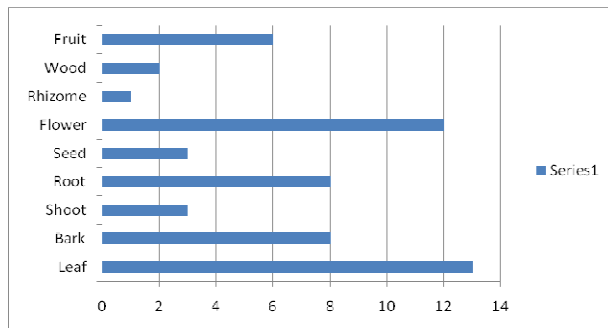


Figure. No.2. Dye yielding plant parts representation.

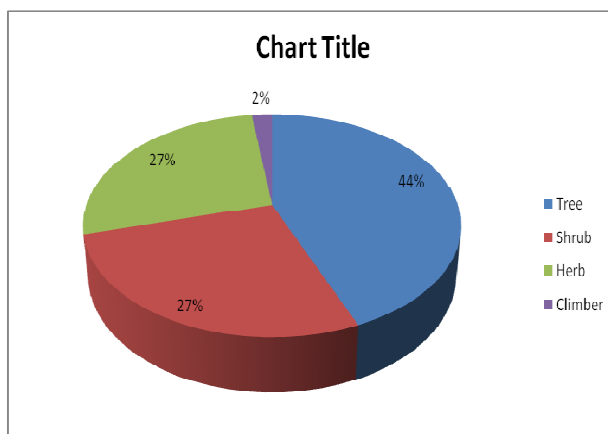


Figure No. 3. Habit wise presentation of dye yielding plant species.

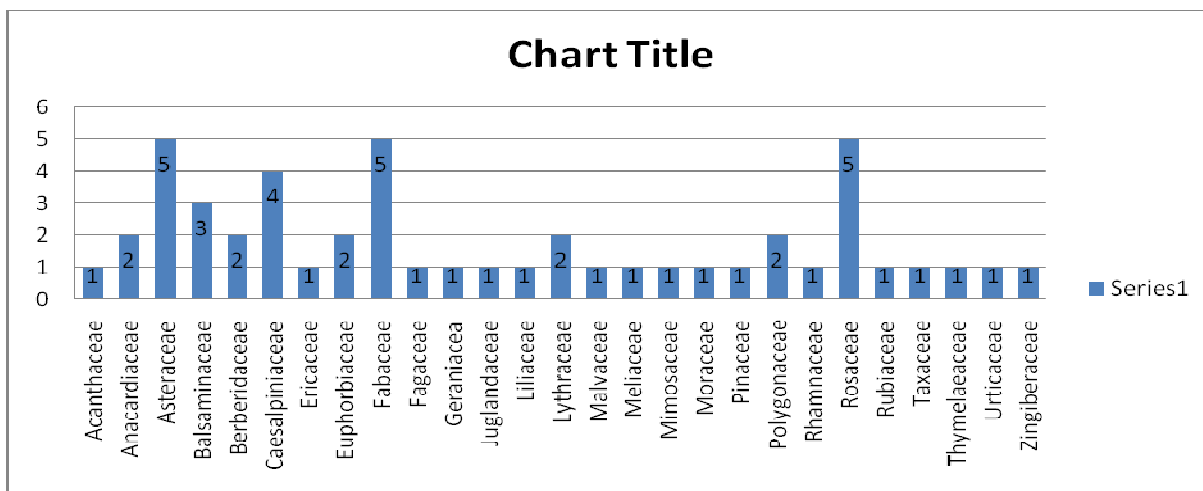


Figure. No.4. Family wise representation of the reported plant species

## DISCUSSION

Plants can give us the whole spectrum of colours to live with nicely dyed textiles and artefacts, papers, cosmetics, human skin, hairs, toiletries, food, medicine, beverages and many other amenities of daily use. Natural dyes have played an important role in the ecological and cultural heritage of human civilisations. During the past century, archaeological discoveries have largely contributed to show that, since the dawn of humankind, the quest for sources of dyes and pigments went abreast with the selection for food and medicinal plants and animals. Throughout history, natural colorants have played a major part in economic and cultural exchanges between nations<sup>28</sup>. As the natural dyes are now a days in great demand not only in the textile sector but in cosmetics, leather, food, beverages, pharmaceutical and many

ther sectors, it is highly desirable that the region wise mapping of the dye yielding plant resource should be carried out across the country at the earliest. The region wise systematic mapping of the available dye yielding plant diversity can help to organise forth coming boom in the natural dyes sector without exerting much pressure on the environment and ecology of our fragile habitats. Proper enlisting and assessment of the available plant resource may result in better economic ventures including the benefit sharing with the local forest dwellers. The present study is a step forward in this direction to record the plant diversity used by the people of Gujjar-Bakerwal tribe in the hilly district of Rajouri. The next step should be detailed documentation of the practices associated with the traditional dyeing and proposing measures for keeping this traditional art alive as well as helping the villagers to make a living out of their art.

Table. No. 1. Enumerations of the dye yielding plant diversity of district Rajouri of Jammu and Kashmir State.

S.No	Botanical Name	Local Name	Habit	Family	Part Used
1.	<i>Acacia catechu</i> Willd.	Khair	Tree	Mimosaceae	Wood
2.	<i>Adhotoda vasica</i> Nees.	Brainker	Shrub	Acanthaceae	Leaves
3.	<i>Aloe barbadensis</i> Mill	Kavargandal	Herb	Liliaceae	Leaves
4.	<i>Bauhinia purpurea</i> L.	Kalari patar	Tree	Caesalpiniaceae	Bark
5.	<i>Berberis aristata</i> DC.	Simbloo	Shrub	Berberidaceae	Roots
6.	<i>Berberis lycium</i> Royle.	Simblu	Shrub	Berberidaceae	Roots
7.	<i>Bistorta amplexicaulis</i> (D. Don.) Greene.	Masloon	Herb	Polygonaceae	Roots
8.	<i>Butea monsperma</i> Roxb. ex Willd.	Simbal	Tree	Fabaceae	Flowers
9.	<i>Carthamus tinctorius</i> L.	Gada	Shrub	Asteraceae	Flowers
10.	<i>Cassia fistula</i> L.	Amaltas	Tree	Caesalpiniaceae	Bark
11.	<i>Cassia tora</i> L.	Phalli	Shrub	Caesalpiniaceae	Seeds
12.	<i>Commelina benghalensis</i> L.	Neelu	Herb	Commelinaceae	Leaves
13.	<i>Continus coggygia</i> Scop.	Tunga	Tree	Anacardiaceae	Leaves
14.	<i>Crucuma Longa</i> L.	Hald	Herb	Zingiberaceae	Rhizome
15.	<i>Daphne papyracea</i> Wall.	Chavan	Shrub	Thymelaeaceae	Stem, Seeds
16.	<i>Erythrina indica</i> Lam.	Thuba	Tree	Fabaceae	Flowers
17.	<i>Ficus religiosa</i> L.	Pipal	Tree	Moraceae	Bark
18.	<i>Geranium nepalense</i> Sweet.	Bandae	Herb	Geraniaceae	Root
19.	<i>Helianthus annuus</i> L.	Surajmukhi	Shrub	Asteraceae	Flowers
20.	<i>Hibiscus rosa-sinensis</i> L.	Jasus	Shrub	Malvaceae	Flowers
21.	<i>Impatiens balsamina</i> L.	Teera	Herb	Balsaminaceae	Flowers, Shoot
22.	<i>Impatiens brachycentra</i> Kar. & Kir.	Teri	Herb	Balsaminaceae	Flowers, Shoot
23.	<i>Impatiens glandulifera</i> Royle.	Bara tera	Herb	Balsaminaceae	Flowers
24.	<i>Indigofera tinctoria</i> L.	Nil	Shrub	Fabaceae	Leaves
25.	<i>Juglans regia</i> L.	Akor, Akhrot	Tree	Juglandaceae	Leaves, Bark
26.	<i>Lawsonia inermis</i> L.	Mehindi	Shrub	Lythraceae	Leaves
27.	<i>Mallotus philippensis</i> (Lam.) Mull. Arg.	Kamala	Tree	Euphorbiaceae	Fruit
28.	<i>Mangifera indica</i> Linn.	Amm	Tree	Anacardiaceae	Bark, Leaves
29.	<i>Phyllanthus emblica</i> L.	Amla	Tree	Euphorbiaceae	Fruit
30.	<i>Pinus wallichiana</i> A. B. Jacks.	Kaial	Tree	Pinaceae	Bark
31.	<i>Prinsepia utilis</i> Royle	Saia	Shrub	Rosaceae	Fruit
32.	<i>Prunus armeniaca</i> L.	Hari, Chroti	Tree	Rosaceae	
33.	<i>Prunus persica</i> L.	Aru	Tree	Rosaceae	Roots, Leaves
34.	<i>Pyrus pashia</i> Buch-Ham. ex D. Don.	Batangi	Tree	Rosaceae	Leaves
35.	<i>Quercus leucotrichophora</i> A. Camus.	Rhien, Braien	Tree	Fagaceae	Bark
36.	<i>Rhododendron arboreum</i> Smith.	Hardul	Tree	Ericaceae	Flowers
37.	<i>Rubia cordifolia</i> non. L.	Kai bel	Climber	Rubiaceae	Root, Wood
38.	<i>Rubus fruticosus</i> Hk. F.	Pakana	Shrub	Rosaceae	Berries
39.	<i>Rumex nepalensis</i> Spreng.	Hula	Herb	Polygonaceae	Root
40.	<i>Tagetes minuta</i> Linn.	Guta pela	Herb	Asteraceae	Flowers
41.	<i>Tagetes patula</i> L.	Guta kusri	Herb	Asteraceae	Flowers
42.	<i>Tamarindus indica</i> L.	Imli	Tree	Caesalpiniaceae	Leaves
43.	<i>Taxus wallichiana</i> Zucc.	Barmi	Tree	Taxaceae	Bark, Fruit
44.	<i>Toona ciliata</i> M. Roem.	Toon	Tree	Meliaceae	Flower
45.	<i>Trigonella foenum-graecum</i> L.	Methi	Herb	Fabaceae	Seed
46.	<i>Urtica dioica</i> L.	Kairi	Herb	Urticaceae	Fruit
47.	<i>Woodfordia fruticosa</i> Kurz	Dhawi	Shrub	Lythraceae	Leaves, Flowers
48.	<i>Ziziphus jujuba</i> Mill.	Broie	Tree	Rhamnaceae	Fruit

The study revealed that most of the reported dye yielding plants are also used for other purposes including in ethnomedicine, ethnoveterinary, furniture making, wood, construction, fodder, edibles and other daily uses. There is an urgent need that the reported plant

species must be subjected to the socio economic and pharmacological studies. District Rajouri is a rich repository of flora and Indigenous traditional knowledge but have not been subjected to the specific detailed studies on the various aspects of biodiversity and conservation. The study area harbours a good number of dye yielding

plants. A detailed study is required to assess the status, utilisation and conservation of the reported plant species. Also there is urgent need to spread a highly motivated awareness and involvement campaign about the biodiversity conservation, ITK and the role and need of the local people in the protection of environment.

## ACKNOWLEDGMENT

I express my gratitude to my teachers Prof. V.K. Anand and Prof. H. S. Kirm for their patronage and guidance. To Prof. R.N.Gohil, Prof. A.K. Waklu and Prof. Anima Langer former Heads of the

Department, Prof. Geeta Sumbali Head, Department of Botany, University of Jammu for extending necessary laboratory and library facilities during my stay in the department. I also thank Prof. Rani Mangotra, Prof. Yashpal Sharma, Dr. Namrata Sharma, Dr. Veenu Kaul my teachers. I express my thanks and gratitude to Dr. Mahroof Khan, Mr. Mohd Arief, Beauv, Chie, Thair, Latief and Yougraj at Earth Foundation International. A special word of remembrance and gratitude to the people of study area particularly to the Gujjar and Bakerwal tribe for providing me support in the field and sharing important ethnobotanical knowledge.

## REFERENCES

- Gokhale S. B., Taty A. U, Bakliwal S. R., Fursule R. A. Natural dye yielding plants in India. *Natural Product Radiance* Vol. 3 (34), 2004: 228-234.
- Pijush K. D. and Amal K. M. Biodiversity and conservation of some dye yielding plants for justification of its economic status in the local areas of Lateritic Zone of west Bengal, India. *Advances in Bioresearch*. 2012. Vol. 3, (1) 42-53.
- Cardon D. Natural Dyes, Our Global Heritage of Colors, Textile Society of America Symposium Proceedings. Paper 12., 2010.
- Abrol B. K. and Chopra I. C. Some vegetable drug resources of Ladakh. *Curr Sci*. 1962, 31:324.
- Beigh S. Y., Nawchoo I. A. and Iqbal. M. Traditional veterinary medicine among the tribes of Kashmir Himalaya: *Jour. of Herbs, Species and Medicinal Plants*. 2003, Vol. 10(4): 121-127.
- Dar G. H. Virjee, Kachro, P. and Buth G. M. Ethnobotany of Kashmir-I Sind Valley. *Jour. Economy Taxonomic Botany*. 19845, 668-675.
- Kachroo P. and Nahvi I. M. Ethnobotany of Kashmiris in G. Singh and P. Kachroo Eds. *Forest Flora of Srinagar and Plants of Neighbourhood Dehra Dun India*. 1976, 239-263.
- Kaul M. K., Sharma P. K. and Singh V. Ethno-botanic studies in north-west and trans Himalaya IV. Some traditionally used tea substitutes from Jammu and Kashmir. *Him. Plant Jour*. 1986, 4:23-28.
- Kaul M.K., Sharma P. K. and Singh V. Ethno-botanical studies in north-west and trans Himalaya. *J. health sci*. 1990, XVI: 81-87.
- Kaul M. K. *Medicinal Plants of Kashmir and Ladakh*. Indus Publishing Company, New Delhi, 1997.
- Khan M. Structural and Compositional Analysis of Phytodiversity of Sewa River Catchment Area in Northwest Himalaya, 2007.
- Kirm 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*. 1999a, 6 (1 & 2): 1-18.
- Kirm H. S., Kapahi B. K. and Srivastava T .N. Ethno-botanical observation on the gymnosperms of Poonch district (J&K State) India. *J. Econ. Tax. Bot*. 1999b, 23(1) : 155-160.
- Kirm H. S. and Kapahi B. K. Ethno-botanical notes on some fern and fern allies of Jammu and Kashmir state, India, *Indian Fern Jour*. 2001a, 18:35-38.
- Kirm 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* 2001a, 4, 8-42.
- Koul, M.L. Some aspects of research on medicinal plants of India," *Eastern Pharmacist*. 1971, 25-29.
- Koul, M. K. High altitude botanicals in integrative medicine-Case studies from Northwest Himalaya. *Indian Jour. of Traditional Knowledge*. 20109, (1): 18-25.
- Nawchoo I. A., Ganai K. A and Wafai B. A. Studies on the conservation biology of *Jurinea dolomiacea* and *Gentiana Kurroa*. In: *Bioresources: concern and conservation* (Eds.) Azra N. Kamili and A.R. Yousuf. CORD, University of Kashmir. 2004, 357-364.
- Rashid A., Anand, V. K. and Shah, A. H. Plant Resource Utilization in the Ethnoveterinary Practices by the Gujjar and Bakarwal Tribes of Jammu and Kashmir state, India. *Jour. Phytol. Res*. 2007, (2): 293-298.
- 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*. 2007, 4 (12) 219-224.
- Rashid A. and Anand, V. K Medicinal plant biodiversity in India: Resource utilization and conservational aspects. *Environment Conservation Journal*. 2008, 9 (1&2) 59-66.
- 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. Ethnopharmacology*, 1989, 27: 63-70.
- Srivastava T.N., Kapahi B. K., Kim, H. S. and Sarin Y.K. Threatened plants of medicinal and aromatic value of North Western Himalaya. *Jour. Non-Timber Forest Products*. 2001, 7 (3/4) : 165-179.
- 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. *International Jour of Botany* 2006, 2 (4): 402-408
- Hooker J. D. *Flora of British India* 1-7, L. Reeve and co., London, 1872-1977.
- Stewart R. R. *An annotated Catalogue of Vascular Plants of West Pakistan and Kashmir*, Fakhri Press Karachi, Pakistan, 1972.
- Swami A. and Gupta, B. *Flora of Udhampur district*, Bishen Singh Mohinder, 1998.
- Cardon D, *Natural Dyes – Sources, Tradition, Technology and Science*. London: Archetype, 2007