

## A preliminary record of dye yielding plants of district Reasi, Jammu and Kashmir, India

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### Abstract

Using natural dyes has due benefits, because these colouring agents are proven as safe to human as well as environmental health. Although source of natural dyes are minerals, animals, lichens and microbes, but plants are understood as the best source since the dawn of human civilization. Till date many ethnic tribes, nomads and communities use at least one plant species imparting the colour to the skin, i.e. *Lawsomia inermis*. Old literature reveals that people were using many species as dye yielding plants but over the period of time the number of such plants in human communities has decreased. The advent of synthetic dyes can be the reason because synthetic dyes are readily available and also have variety of tints and hues. During the current study an attempt has been made to work out traditional knowledge associated with dye yielding plants of District Reasi in Union Territory of Jammu and Kashmir, India.

**Key Words:** *Raade* festival; natural dye; edible dye; nomads; Tulsi Chittran.

### Introduction

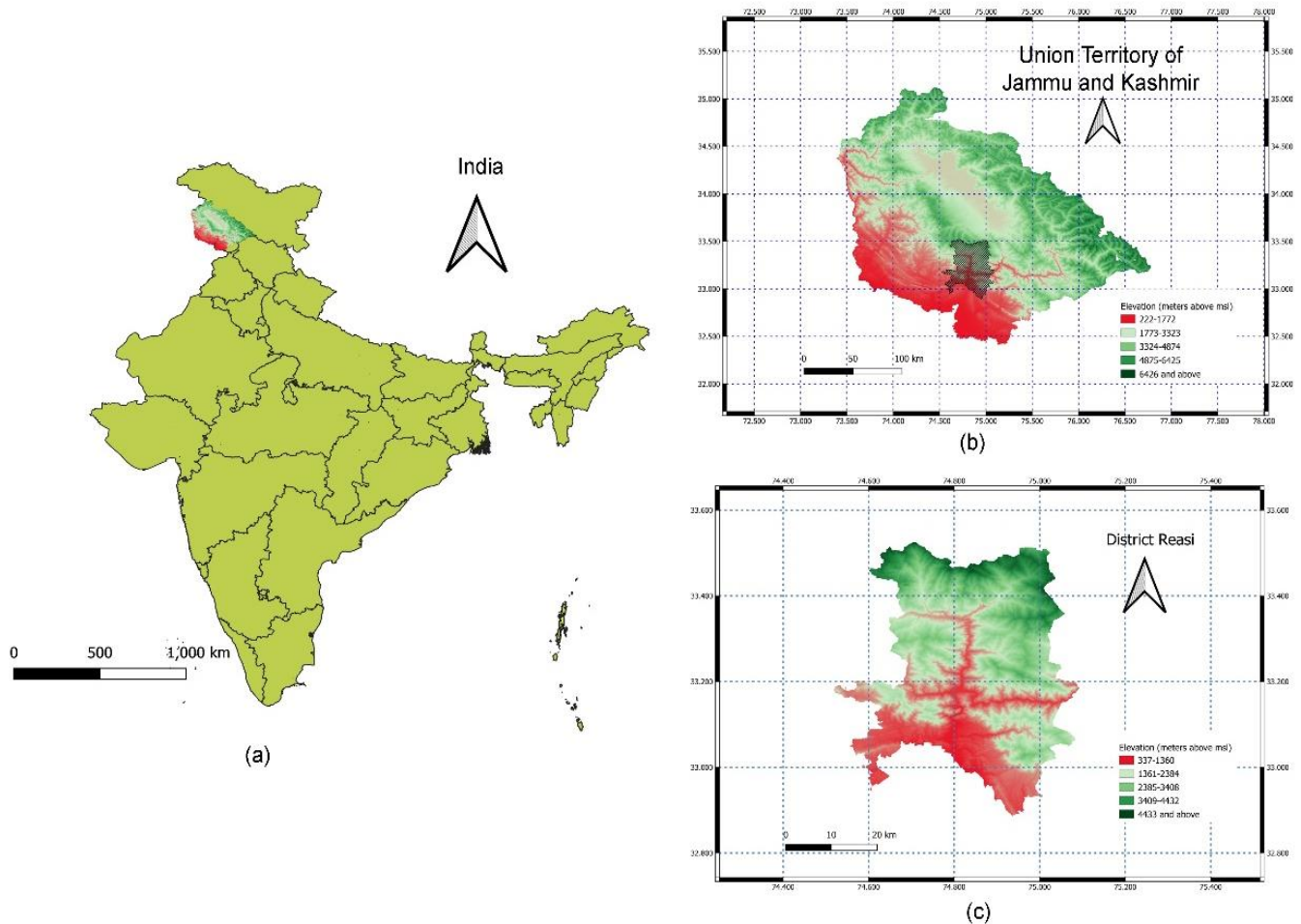
Natural dyes were used by man even before the dawn of civilization. Primitive man gathered information on beneficial as well as harmful plant species through his learned experiences. His skeptic nature and curiosity to know about things around him led to many discoveries and inventions. The knowledge thus acquired was a result of constant exploration and learning. Initially most plants with edible utility were explored. Fascinated by colours of nature and as the need aroused, man started to explore resources that could be used as colour. People used to obtain dyes from minerals then eventually used animals and plants as dye resources. As the colours held a great significance among people, he started to colour weapons, body, fabrics, etc. Coloured materials are symbolically used for example body tattooing by tribes to mark group identities, for communication and expression of certain beliefs and ideas (Elwin 1986; Gautam 2011). Ancient procedures for extracting the colors from plants were simple but an improvement in these procedures is observed with the advancement in technology. In ethnobotanical studies, it is important to document all the associated information on dye yielding plants of a community or a tribe. Because the available ethnobotanical information can help to

understand the methods of sustainable utilization of resources. Ethnobotanical surveys conducted in Reasi district of Union Territory of Jammu and Kashmir reveals that about 32 plant species are still used by various communities like Bakerwals, Gujjers, and local people of the region. Bakerwals and Gujjers are the nomadic people in Jammu and Kashmir, who move from lower to higher altitudes during summers and high to lower altitudes in winters.

### Methodology

Ethnobotanical surveys were conducted for one year (February 2021 to January 2022) in Reasi district of union Territory of Jammu and Kashmir, India (Fig. 1). To obtain first-hand information on dye yielding plant species, communities including Bakerwals, Gujjers, and local people were interviewed using semi-structured questionnaire. During the survey, data on vernacular name of plant species, part used, color produced and detailed methods of extraction of dye from plant species were recorded. The specimens were also collected, dried, mounted and labeled on herbarium sheets and identified with the help of available literature like Kant and Dutt (2005), Rashid (2013), Jarngal and Katoch (2014) and Wani et al. (2022).





**Figure 1.** Geographical map of the study area (a) India with highlighted portion of Union Territory of Jammu and Kashmir, (b) Elevation map of UT of Jammu and Kashmir, and (c) Elevation map of District Reasi (study area).

## Results and discussion

The botanical names of plant species are arranged alphabetically followed by family in bracket, vernacular names with language in bracket, habit, part used, colour produced, voucher specimen number in brackets, method of extraction and utility.

1. *Arnebia benthamii* (Wall. ex G. Don) I.M. Johnst. (Boraginaceae); 'Ratanjot' (Dogri); Herb; Root; Red (VS123). Dried rhizomes are used to color gravy of curries and also as hair dye when applied with mustard oil.
2. *Berberis lycium* Royle (Berberidaceae); 'Krumbal' (Dogri); Shrub; Root; Yellow (VS122). Roots are crushed and boiled in water to obtain a yellow-coloured extract. The woolen fabrics are then dipped into it and boiled for some time to fix color.
3. *Beta vulgaris* L. (Amaranthaceae); 'Chkunder' (Dogri); Herb; Leaf and Roots; Red (VS124). Leaves are chopped and cooked along with other vegetables to impart color on them.
4. *Butea monosperma* (Lam.) Kuntze (Fabaceae); 'Palah' (Dogri); Tree; Flowers; Orange (VS125). Flowers are kept in hands and rubbed together to color palm and fingers.
5. *Cassia fistula* L. (Fabaceae); 'Krangal', 'Kaniyaal' (Dogri); Tree; Bark, Leaves, Flowers and Pods; Reddish-brown and yellow (VS118). Bark and pods are boiled in water to obtain a colored extract in which hides are immersed for 2-3 days for tanning. Fresh newly grown leaves are crushed and paste is applied on scalp, hand and feet to color them. Dried flowers and leaves are powdered and are used as rangoli color.
6. *Celosia argentea* L. (Amaranthaceae); 'Kukadsera' (Dogri)/'Mawal' (Kashmiri); Herb; Flower; Red (VS126). Either fresh flowers or its dried powder is cooked with vegetables and curries to impart red color to the vegetables.
7. *Crocus sativus* L. (Iridaceae); 'Kesar' (Dogri); Herb; Stigma and Style; Golden-yellow (VS127). Dried flower parts are used as tilak in many religious ceremonies and also used to colour and flavor Kheer.
8. *Curcuma longa* L. (Zingiberaceae); 'Haldal' (Dogri); Herb; Rhizomes; Yellow (VS115). Fresh rhizomes are boiled in water and cotton yarns (Sutr) are dipped into boiling coloured extract to colour them. Sun dried rhizomes are powdered and used as colouring agent in

- cooked vegetables, curries and pickles. Haldi is also used as tilak in religious ceremonies.
9. *Dalbergia sissoo* Roxb. ex DC. (Fabaceae); 'Taali' (Dogri); Tree; Leaves and wood; Red (VS113). Newly grown fresh leaves are made into paste and applied on scalp for colour. Chewing of tender twigs impart colour to lips and gums. The wood is crushed and the watery extract is applied to the wooden frames for windows and doors to colour them.
  10. *Girardinia diversifolia* (Link.) Friis (Urticaceae); 'Sadder' (Dogri)/ Moti Aein; Shrub; Roots; Tosa (Reddish brown) (VS105). Roots are boiled in water to get colored extract in which woolen fabrics are boiled to impart color. This provides durability to the fabrics.
  11. *Grewia optiva* J.R. Drumm. ex Burret (Tiliaceae); 'Tamman' (Dogri); Tree; Fruits; Orange (VS119). Ripe fruits when chewed gives a tint to lips and gums.
  12. *Holoptelea integrifolia* (Roxb.) Planch. (Ulmaceae); 'Chmair sonna'/'Chmair rukh'/'Dand Rukh' (Dogri); Tree; Leaves; Reddish-orange (VS117). Leaves when chewed give colour to lips and gums.
  13. *Impatiens balsamina* L. (Balsaminaceae); 'Teera' (Dogri); Herb; Leaves; Reddish-orange (VS112). Fresh leaves are crushed and made into paste which is then applied on hands to impart color. Also, juice from citrus fruits like lemon can be added to the paste to enhance color.
  14. *Juglans regia* L. (Juglandaceae); 'Akhrod' or 'Khod' (Dogri); Tree; Bark, Leaves and Fruit rind; Red (VS110). Bark (Roongli daatun), leaves and green fruit rind when chewed gives color to lips, tongue and gums. Green fruit rind, fresh leaves and bark are boiled in water and the extract obtained is used to color Safa (Turbans) and other fabrics. Also, a paste is prepared by adding curd to crushed fruit rinds which is applied on scalp to dye hair black.
  15. *Justicia adhatoda* L. (Acanthaceae); 'Braenkad' (Dogri); Shrub; Leaves; Green (VS120). Leaves are dried and made into powder which is then used to make rangoli on "Raade" festival.
  16. *Lawsonia inermis* L. (Lythraceae); 'Mendi' (Dogri); Shrub; Leaves; Red (VS116); Leaves are crushed and made into paste which is then applied on hands and hair to impart color. Sometimes juice of citrus fruits or curd is also added to the paste to enhance color.
  17. *Luffa aegyptiaca* Mill. (Cucurbitaceae); 'Tori' (Dogri); Climber; Leaves; Green (VS114). Leaves are crushed and the extracted juice is applied to draw motifs on traditional Tulsi planter (Kund) on the day of Tulsi Vivah.
  18. *Mallotus philippensis* (Lam.) Mull.-Arg. (Euphorbiaceae); 'Kamila' (Dogri); Tree and Fruits; Red and yellow (VS101). Fruits when rubbed in between hands impart yellow colour to the skin. Also, color is prepared by adding fruit hairs in paste made of soaked rice which is used to draw motifs on walls. Fruit hair powder is also used as rangoli color.
  19. *Melia azedarach* L. (Meliaceae); 'Draenk' (Dogri); Tree; Leaves; Green (VS107). Leaves are dried and made into powder which is used to decorate "Raade" with rangoli.
  20. *Oryza sativa* L. (Poaceae); 'Chool' (Dogri); Herb; Grains; White (VS131); Grains are soaked in water and a paste is prepared which is then used to draw motifs on walls of kuccha house. Rice starch is kept in an iron container for about a month until black color appears then hides are kept immersed in it for tanning.
  21. *Phyllanthus emblica* L. (Phyllanthaceae); 'Ambla' (Dogri); Tree and Fruits; Black (VS102). Fruits are kept in an air tight container for about one and a half month until a watery black colour extract is obtained. This watery extract is then directly applied on hair roots or is mixed with Henna paste and then applied on scalp. The mashed fruits are made into cakes and sun dried. Prior to its application on scalp these cakes are soaked in water preferably in an iron utensil for about a day. Fruits are boiled either in an iron container or an iron piece is added to fruits and then boiled in water. The extract obtained is used to dye fabric.
  22. *Portulaca grandiflora* Hook. (Portulacaceae); 'Doopahr di Rani' (Dogri); Succulent herb; Flowers; Pink (VS111). Flowers are crushed and rubbed on fingers and palm to impart color.
  23. *Punica granatum* L. (Lythraceae); 'Drooni' (Dogri); Shrub; Fruit rind and leaves; Black (VS133). Fruit rinds are boiled to get black colored extract which is used for dyeing textile and leather tanning. The obtained extract provides strength and durability to fabrics. Leaf paste is prepared by adding curd to it which is then applied on scalp to dye hair. Dried fruit rind powder which gives yellow color is also used to decorate Raade.
  24. *Pyrus pashia* Buch-Ham. ex D. Don (Rosaceae); 'Kainth' (Dogri); Leaves; Red (VS108). Newly grown fresh leaves are crushed and the paste is applied on scalp.
  25. *Quercus leucotrichophora* A. Camus (Fagaceae); 'Irri' (Dogri); Tree; Leaves; Red (VS130) Leaves are made into paste and applied on scalp to color hair.
  26. *Senegalia catechu* (L.f.) P.J.H.Hurter & Mabb. (Fabaceae); 'Khair kath' (Dogri); Tree; Wood; Red (VS129). Wood is boiled in water to get an edible dye which is used as tea or Kawah.
  27. *Solanum nigrum* L. (Solanaceae); 'Kayakothi' (Dogri); Herb; Leaves; Green (VS109). Fresh leaves are crushed and the juice extracted is mixed with paste made of soaked rice which is then used to draw motifs on walls of Kuccha house.
  28. *Tagetes erecta* L. (Asteraceae); 'Gutti' (Dogri); Herb; Flowers; Yellow (VS121). Flowers are crushed and

rubbed against whitewashed walls of traditional Tusli planter (Kund) to draw motifs on Tusli pooja day. Dried flower powder is also used as rangoli color.

29. *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. (Combretaceae); 'Arjan' (Dogri); Tree; Bark; Red (VS132). Bark is boiled in water to get an edible dye which is used as tea or Kawah.
30. *Toona hexandra* (Wall.) M.Roem. (Meliaceae); 'Toonu' (Dogri); Tree; Flowers; Kesari (Yellow) (VS104). Flowers are boiled in water which is then used to dye fabric (Dupattas). Dried flowers are also used as rangoli color.
31. *Triticum aestivum* L. (Poaceae); 'Kaank' (Dogri); Herb; Leaves; Green (VS103). Leaves are crushed and the juice is extracted which is then used as herbal Holi colour.
32. *Vitex negundo* L. (Lamiaceae); 'Bnaa' (Dogri); Shrub; Leaves; Green (VS106). Dried leaves are powdered which is then used as herbal rangoli colour to decorate "Raade".
33. *Woodfordia fruticosa* (L.) Kurz (Lythraceae); 'Dhain' (Dogri); Shrub; Leaves and Flowers; Pink (VS128). Flowers and leaves are dried and powdered which is then used as Holi and rangoli colour dye.

### Conclusion

The paper deals with a total of 33 plant species covering 33 genera under 25 families used by locals of Jammu region as dye resources. It is analyzed that these plants are used by locals as food colour (7), skin and hair dye (13), fiber or fabric dye (7), leather tanning (3), mural paintings (5), wood colouring (1), herbal Holi and rangoli colour (10) and in religious ceremonies (2). The plant products are used in the form of paste, powder or aqueous extract. "Raade" is a traditional festival among Dogra (Duggger) culture which is losing its identity with advancement in ethos. It is believed by the informants that the sanctity of the festival is maintained when natural dyes are used to impart the colour in the rangoli during this festival. Colors obtained by drying plant materials, powdered bricks and coal are used by women to decorate "Raade" with rangoli patterns on a month long Raade festival. In addition, there are some specific plant species which have direct association with celebration of festivals like *Impatiens balsamina*. Its leaves are applied on hands and nails on the eve of Krishna Janmashtami. Many women on occasion of Karwa Chauth use bark of *Juglans regia* to cleanse tooth and color lips. The bark is also offered as gift to other women on ceremonies. Also, plant-based herbal colors find their usage in rangoli and Holi. On the day of Tusli Viva, women also draw motifs on walls of Tusli Kund a practice called as Tusli Chittran. Further, usage or even touching of a certain plant

such as *Lawsonia inermis* L. (Mehndi) and *Melia azedarach* L. (Draenk) is strictly prohibited in certain communities.

It is also observed that traditional knowledge on some of the plant species is restricted to some specific group of people like use of *Girardinia diversifolia* which is less known dye yielding plant species in the region. According to some informants colour obtained from the roots of the *G. diversifolia* was earlier used to dye the animal protein like wool, but now-a-days this practice is not in operation. In contrast some dye yielding plant species like *Arnebia benthamii*, *Berberis lycium*, *Butea monosperma*, *Crocus sativus*, *Curcuma longa*, *Impatiens balsamina*, *Juglans regia*, *Lawsonia inermis*, *Punica granatum*, *Pyrus pashia*, *Tagetes erecta*, *Woodfordia fruticosa* are used frequently by the people in Reasi district. Traditional knowledge (TK) on other dye yielding species is at intermediate stage of extinction. Therefore, it is important to document such TK and analyze it properly so that further scientific research can be conducted to find out the significant amount of dye and protect and preserve these valuable traditional practices.

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