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ETHNO-MEDICINAL USES OF FLORISTIC DIVERSITY OF SUB-TROPICAL FORESTS OF JAMMU, JAMMU AND KASHMIR, INDIA

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ABSTRACT

The study was conducted to record the diversity, traditional uses and the utilization pattern of medicinal plants in sub-tropical forests in and around erstwhile district Jammu, Jammu and Kashmir. During the survey, out of total 395 plant species recorded, 118 species belonging to 107 genera in 56 families revealed the ethno-medicinal relevance to the area. These belonged to 42 trees, 27 shrubs, 39 herbs, 08 climbers, 1 epiphyte and 1 bamboo species. Leaves (46 species) were among the largest of the plant parts used followed by roots (38), fruit (31), bark (27), seeds (20), flowers (11), tubers (4), whole plants (4), gum (3), buds (2), latex (2), oils (2), bulbs (1) and fiber (1). The paper highlights the present status of ethno-medicinal diversity and suggests the strategies for conservation and efficacious management of medicinal plants around Jammu *Siwaliks*.

INTRODUCTION

Western Himalaya represents one of the rich repositories of medicinal plant wealth in Indian Himalayan Region (IHR). Of the 18,440 species of plants reported from IHR (Singh and Hajra 1996), 1748 species have been found medicinal (Samant *et al*., 1998). This medicinal wealth has long been utilized by the natives of Himalayas in their traditional therapeutic formulations. About 2000 plant species are used in Ayurveda, Siddha, Homeopathy and Unani systems of medicine (Anonymous, 2000; Kirtikar and Basu, 2001). The tribal and rural people of Himalayas have successfully preserved the traditional knowledge associated with the curative properties of the vegetation around them and this knowledge has passed down year after year to the generations and is extensively used for the treatment of common diseases and conditions (Ekka *et al*., 2007). Over the years, the irrational and un-scientific extraction of wild medicinal herbs has engendered an irrevocable threat to medicinal gene pool of Himalayas. This scenario therefore warrants extensive investigations on the extent of availability of wild medicinal plants in the Himalayas. Though a large number of studies have been conducted in India, the information on ethno-botanical aspects is scanty and scattered on Western Himalayas. Some of the researchers have contributed to the ethno-medicinal facets in different parts and regions of Western Himalayas (Naithani, 1973; Gaur *et al*., 1980, Nautiyal, 1981; Pangtey, 1981; Karnick and Pathak, 1982; Pangtey, *et al*., 1982; Gaur *et al*., 1983, Negi *et al*., 1985; Gaur *et al*., 1986; Negi, 1988; Joshi *et al*., 1989; Jain and Saklani, 1991; Negi and Gaur, 1991; Gaur *et al*., 1993; Sundriyal and Sharma, 1995; Saklani and Jain, 1996; Pundir and Singh, 1997 a, b; 1998 a, b; 1999 a, b; Joshi *et al*., 2001; Kaul and Handa, 2001; Samant *et al*., 2001; Badola, 2002; Pundir and Singh, 2002; Singh and Pundir, 2004; Sundryal, 2005; Bhardwaj *et al*., 2014; Bisht and Pundir, 2014; Patnaik and Rath, 2014; Sharma *et al*., 2015). Various studies have been conducted on the ethno-medicinal aspects of plants in the state of Jammu and Kashmir too (Dhar and Kachroo, 1983; Dar *et al*., 1984; Vir Jee *et al*., 1984; Kachroo and Navi, 1987; Kumar and Naqshi, 1990; Kapur, 1991; Ara and Naqshi, 1992; Kaul *et al*., 1994; Navchoo and Bhat, 1994; Kapur, 1995; Kaul *et al*., 1995; Sharma, 1995; Singh, 1995; Adhikari, 2003; Lone, 2003; Sarin, 2003; Khan *et al*., 2004; Kumar *et al*., 2009 a,b & c; Kumar and Hamal,

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2009; Bhellum and Singh, 2012; Mir and John, 2014; Nidhi and Nitin, 2014). The Jammu *Siwaliks* are well known for their dry sub-tropical climate comprising a number of medicinal and aromatic plants being used since long by locals and traditional herbsmen (Sharma, 2003). Owing to its increasing demand and value, it is necessary to understand the distribution and conservation status of medicinal wealth in their natural habitats. An integrated study was therefore conducted to better understand the diversity, traditional uses and utilization pattern of the medicinal plants in Jammu *Siwaliks*.

MATERIAL AND METHODS

Study area

The study area with an approximate geographical coverage of approximately 3250 sq km is located on a low-level hill country outside Pirpanjal and between Jehlum and Ravi constituting Jammu hills in Jammu and Kashmir State, India. Mostly covering the erstwhile Jammu district (now districts Samba and Jammu respectively), the area is interspersed with typical sub-tropical vegetation ranging from 300 m asl to 1,675 m asl. The *Kandi* belt, in local terminology it includes small dry hillocks and gentle slopes made up of boulder mass. Beset with gorges and ravines, the major part of this zone is under forests and offers but limited facility to agriculture.

This undulating tract, criss-crossed through a number of shallow seasonal streams locally known as '*Khads'* with stony beds, active only during rains. The soils are shallow and infested with gravel and stones. The Jammu Siwaliks has a markedly periodic climate, characterized by dry and increasingly hot season from March to June, a warm humid monsoon season from July to September and a dry and cold weather from October to December. The normal annual rainfall of Jammu is 1113 mm, 72% of it is received during monsoon months with average number of rainy days per year being 54. June is recorded as hottest month with average maximum 47^0C with January being the coldest month with average 6.8^0C. The foggy winters and scorching summers bear a marked climatic perturbation.

Data collection and analysis

The secondary data was collected from 750 sample points, mostly the villages / hamlets of districts Jammu and Samba respectively. The investigations were the part of qualitative and quantitative enumeration of biodiversity in the said locations on spatial and temporal scales. All the three forest types *viz.,* Northern dry mixed deciduous forests, Himalayan subtropical scrub, Himalayan subtropical Pine forests and grasslands, barren/fallows, agricultural landscapes etc. were surveyed in different seasons to collect information on the uses and utilization pattern of medicinal plants by the locals including *Sarpanchs,* shopkeepers, housewives etc. The traditional medicine men like *Vaidyas* and *Hakims* were interviewed separately. An open ended questionnaire was followed to collect the relevant information. Their vernacular names, crude formulations, parts used and life forms were noted along with their field photographs. The mode and extent of collection, storage and distribution was also recorded. The plants were identified by using local floras and by consulting the Herbarium of Department of Botany, University of Jammu. The data was compiled and analyzed for different parameters.

RESULTS

Of the total 395 plant species collected from the study area, 118 species belonging to 107 genera and 56 families were recorded with medicinal relevance to the local communities. These belonged to 42 trees, 27 shrubs, 39 herbs, 08 climbers, 1 epiphyte and 1 bamboo species. Fabaceae was the most dominating family comprising 14 species in 11 genera followed by Lamiaceae (6/6), Malvaceae (6/6), Apocynaceae (5/5) and Euphorbiaceae (5/4) respectively. The information along with vernacular names, habit, families, distribution, conservation status, parts used and ethno-medicinal importance has been provided in Appendix-1. The medicinal plants recorded from the study area assume a great significance in terms of their potential for curing different kinds of diseases like diarrhoea, dysentery, digestive problems, diabetes, rheumatism, boils and abscesses, anemia, tooth and gum problems, diphtheria, leprosy, tuberculosis, skin ailments, asthma, cold, cough, fever, chronic hepatitis, urino-genital troubles, scurvy, jaundice etc..

The plants and their parts are consumed orally or applied externally in the form of infusion, decoction, paste or powder either individually or different parts in defined ratios for treating different diseases. Among the parts of medicinal plants used, leaves are highly utilized part (46 species), followed by roots (38 species), fruits (31 species), bark (27 species), seeds (20 species), flowers (11 species), tubers (4 species), whole plants (4 species), gum (3 species), buds (2 species), latex (2 species,), oils (2 species), bulbs (1 species) and fiber (1 species) in the local formulations (Appendix-1).

DISCUSSION AND CONCLUSION

The traditional medicine in Indian context has a long established history and a wider acceptability. The present study provides comprehensive information on the medicinal flora, its usage and utilization pattern. The occurrence of 30% of the flora of medicinal relevance, speaks of the ethno-botanical significance of vegetation in *Siwaliks*. Two thirds of the species were found sporadic in distribution mostly growing wild in forest landscapes, while few of them being successfully cultivated in the plains since long. 32 species were recorded with low frequency, density and abundance values, *i.e.,* diminishing population scenario, whereas four species, *viz., Rauvolfia serpentina* L., *Eremostachys superba* Royle, *Randia tetrasperma* Blth. & Hk. f. and *Viola canescens* Wall. revealed a rare distribution in the restricted pockets thus warranting their immediate conservation and landscape management.

This study concluded that even though the access to allopathic medicines is at door steps, many people in this part of the region still rely on local herbal formulations for the treatment and cure of common diseases such as, cold, cough, fever, headache, snake bites, skin diseases, teeth related infections, stomach infections, urino-genital problems etc. The local

Vaidyas and *Hakims* still enjoy the rapport, their forefathers established a long before in the era of Maharajas and are successfully disseminating the knowledge through generations. A good volume of literature is still available with these practitioners in the city and villages as well. This documentation of information on indigenous knowledge and practices will help conserving the traditional knowledge (Ghani, 2003) which needs to be studied, documented and preserved for the benefit of human kind, before it is lost forever (Dhar *et al*., 2002). Since medicinal germplasm has a long established lineage in the region, their cultivation on the community and state lands will relieve the pressure from the forests, besides improving the socio-economic fabric of the region. The herbal and aromatic gardens should be raised in the forest-agriculture interface and mass propagation on modern scientific lines be promoted. Together with awareness and extension activities, the cultivation of medicinal and aromatic plants should be encouraged.

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Appendix 1. Ethno-medicinal enumeration of flora of sub-tropical forests of Jammu, Jammu and Kashmir

S. No.	Name of Species	Vernacular	Habit	Family	Distribution	Part used	Economic Importance
1.	*Abrus precatorious* L.	Ratti, Rakat	Climber	Fabaceae	Widely distributed	Leaf, seed	Leaves used as carminative, expectorant and stomachic.
2.	*Abutilon indicum* Sw.	–	Shrub	Malvaceae	Ramnagar, Miran Sahib, Sakranpur	Stem	Plant used as diuretic, demulcent and laxative.
3.	*Acacia catechu* Willd.	Khair	Tree	Fabaceae	Ramnagar, Nandani, Sukhetar	Heart wood	'*Katha*' produced from heartwood used in sore throat and cough.
4.	*Acacia farnesiana* Willd.	Kikri	Tree	Fabaceae	Avenue plantation	Flower	Flowers used as cassic perfume.
5.	*Acacia nilotica* Willd.	Kikar	Tree	Fabaceae	Sparse plantation	Bark, Twig	Bark decoction given in urino-genital diseases. Twigs used to wash teeth.
6.	*Achyranthes aspera* L.	Puthkanda, Parkanda	Herb	Amaranthaceae	Waste lands, Near habitations	Seed, Leaf, Root	Plant used as antidiabetic and antirheumatic. Seed powder for treating piles. Leaves powder a remedy for boil and abscess. Roots, stomachic and digestant, used for treatment of pneumonia and toothache. Root paste act as anti-fertility drug.
7.	*Aegle marmelos* Corr.	Bel	Tree	Rutaceae	Ramnagar	Fruit, Leaf	Unripe fruits astringent digestive and stomachic. *Marmelosin*, a principle compound act as cardiac depressant. Leaves fruits and roots have antibiotic properties. Ripe-fruits edible.
8.	*Agave sisalana* Perr.	Kuera	Shrub	Asparagaceae	Plantation in Kandi belt	Leaf, Pulp	Pulp waste act as a source of *cortisone* for treatment of rheumatoid arthritis, certain allergies and cancer.
9.	*Albizia lebbeck* Benth.	Sareen	Tree	Fabaceae	Ramnagar, Nandani	Leaf, Seed	Leaves and seeds for eye troubles, bark for boils.
10.	*Asparagus adscendens* Roxb.	Sahns pour	Shrub	Liliaceae	Ramnagar, Domel fields	Tuber	Tubers cooling, demulcent and diaphoretic.
11.	*Azadirachta indica* Juss.	Neem	Tree	Meliaceae	Plantation	Leaf, Bark, Flower, Twig	Leaves possess insect repellant and antiseptic properties. Bark for skin troubles. Flowers tonic and stomachic. Berries purgative, emollient. Non-dried oil of seed in skin infection. Fresh tender twigs used to clean teeth.
12.	*Bambusa arundinacea* Willd.	Bans	–	Bambusaceae	Plantation	Leaf, Stem	Leaves emmenagogue, anthelmintic, astringent. Stem and leaves are used as blood purifier, leucoderma and inflammations.
13.	*Barleria cristata* L.	Kali Barenker	Shrub	Acanthaceae	City suburbs	Leaf, Root	Leaves chewed for relief in toothache. Root decoction given in anemia.
14.	*Bauhinia variegata* L.	Kachnar, katrer	Tree	Fabaceae	Ramnagar	Root, Bark, Flower, Bud	Roots carminative, decoction prevents obesity. Bark tonic and anthelmintic, flowers laxative, buds cooked as vegetable and used as pickle.
15.	*Boerhavia diffusa* L.	It-sit	Herb	Nyctaginaceae	Dry and moist waste places	Root	Plant rich source of alkaloids used to treat asthma, dropsy, jaundice and gonorrhea. Root powder cure eye diseases.
16.	*Bombax ceiba* L.	Simbal	Tree	Malvaceae	Ramnagar, Nandani, Dharangari	Bark, Fruit	Bark demulcent, tonic and styptic. Fruits stimulant, expectronant and diuretic used to treat ulceration of kidney and bladder.
17.	*Butea monosperma* Taub.	Palah, Tatooah	Tree	Fabaceae	Ramnagar, Beyond Bari Brahamana	FlowerLeaf, Gum, Bark	Flowers and leaves astringent, depurative, diuretic and aphrodisiac. Gum used to cure diarrhoea. Flowers and seeds in decoction used as wormicide.
18.	*Calotropis procera* R. Br.	Akk	Shrub	Asclepiadaceae	Dry waste places throughout	Root, Flower	Root bark used for leprosy and eczema. Flowers tonic, used in cough, cold and asthma.

……*Continue*

19.	*Cannabis sativa* L.	Bhang	Herb	Cannabaceae	Moist waste places in plains	Fibre	Hump is used to treat asthma, hemorrhages, tetanus, gonorrhea and nervous disorders.
20.	*Capparis sepiaria* L.	Rihar	Shrub	Capparaceae	Ramnagar, Dharangari	Bud, Fruit, bark, root	Caper buds and fruits for the cure of scurvy. Bark and root is aperitive, diuretic, resolvent and tonic.
21.	*Cardiospermum halicacabum* L.	Kanfari	Herb	Sapindaceae	Ramnagar, Dharangari, Nandani	-	Plant diuretic, stomachic and rubefacient, used to cure nervous disorders. Locally applied to cure dandruff.
22.	*Carrisa opaca* Stapf.	Garna	Shrub	Apocynaceae	Abundant throughout	Leaf, Root, Fruit	Leaf decoctions in remittent fever. Roots stomachic and purgative. Fruits edible.
23.	*Casearia tomentosa* Roxb.	Jhilla	Tree	Salicaceae	Ramnagar, Jhajjar Kotli	Root, Fruit	Root bark is a reputed tonic for Anaemia. Decoction of root is given for cure of diabetes. Root paste anthelmintic, fruit pulp diuretic.
24.	*Cassia fistula* L.	Amaltas, Karangal	Tree	Fabaceae	Present throughout	Pulp, Bark	'Cassia pulp' is a well-known laxative for habitual constipation. Cathartic acid in pulp is considered purgative.
25.	*Cassia tora* L.	Haedma	Herb	Fabaceae	Waste places throughout	Seed	Seed paste used in treatment of ringworm, itch, tumors, ulcers. Seed powder for abnormal delivery.
26.	*Centella asiatica* Urban	Brahmi, Ghor-sumbi	Herb	Apiaceae	Throughout in low lying areas	Leaf, Root, Fruit	Leaves used as brain tonic. Above ground portion used to treat tuberculosis.
27.	*Chenopodium album* L.	Bathu	Herb	Chenopodiaceae	Waste places all over	Leaf	Leaves rich in vitamin C and are edible, mildly laxative and relieve stomach pains.
28.	*Cissampelos pariera* L.	Battal Bel	Climber	Menispermaceae	Ramnagar, Sukhetar	Root	Root anthelmintic, antidote to snake poison, astringent, carminative diuretic, expectronant, febrifuge, sedative and tonic, paste given against toothache and leucorrhoea.
29.	*Colebrooka oppositifolia* Sm.	Chiti Suhali	Shrub	Labiateae/Lamiaceae	Ravines of Nandani, Sukhetar	Leaf, root	Leaves applied to wounds and bruises, roots in epilepsy.
30.	*Cordia dichotoma* Forst.	Lasoori	Tree	Boraginaceae	Kala Kapur, Achar Kund	Fruit	Fruit astringent, anthelmintic, diuretic, demulcent, expectronant and used in urinary diseases.
31.	*Crataeva adansonii* DC	Barna	Tree	Capparaceae	Ramnagar, Sukhetar, Dhahrangari	Bark, Flower	Bark liver stimulant, laxative, appetizer, in calculus and urinary infection. Flowers astringent.
32.	*Cuscuta reflexa* Roxb.	Andal-Kaandal	Epiphyte	Convolvulaceae	Abundant throughout	Stem juice	Plant purgative, astringent and anthelmintic, infusion given against diarrhoea and applied on sores and itches. Stem juice used to kill lice. Hair tonic.
33.	*Cynodon dactylon* Pers.	Khabbal	Herb	Poaceae	Most common and abundant everywhere	Root	Root decoction used as diuretic, in dropsy and secondary syphilis, plant juice astringent and antiseptic.
34.	*Datura metel* L.	Tatoora	Herb	Solanaceae	Moist, dry, rocky, waste areas	Whole Plant	Whole plant is antiseptic, narcotic, sedative and used to cure asthma. Poultice of leaves check inflammation of breasts.
35.	*Dioscorea belophylla* Voigt.	Tarad, Taradel	Climber	Dioscoraceae	Common in deciduous forest	Tuber	Tubers are edible and used to cure dysentery and piles.
36.	*Dodonaea viscosa* Jacq.	Santha	Shrub	Sapindaceae	Abundant in Kalidhar on rocky faces	Leaf	Leaves abortificient, febrifuge and also used for wounds burns and swellings.
37.	*Eremostachys superba* Royle	Gajjar-moola	Herb	Lamiaceae/Labiataea	Domel	Tuber	Tubers known as '*Gajjar Moola'* to cure *mastitis* in cattle
38.	*Euphorbia hirta* L.	Jar Dudli	Herb	Euphorbiaceae		Whole plant	Plant used to treat colic troubles, dysentery, cough, asthma, worms and vomiting. Eaten as vegetable also.
39.	*Euphorbia royleana* Boiss.	Thor	Shrub	Euphorbiaceae	Kalidhar, Sukhetar	Latex	Latex is cathartic, laxative and anthemintic. It is used to cure tooth infection.
40.	*Ficus benghalensis* L.	Borh	Tree	Moraceae	Planted and self sown throughout	Latex, Bark, Leaf	Latex for rheumatism and lumbago. Bark infusion used in diarrhoea, dysentery and diabetes. Leaves tonic and cooling.
41.	*Ficus hispida* L.f.	Kharkhumabal	Tree	Moraceae	Throughout in shady places	Fruit	Fruits tonic, lactogogue and emetic.
42.	*Ficus palmata* Forssk.	Fagwara	Tree	Moraceae	Throughout	Fruit	Fruits demulcent, laxative, used in lung and bladder disorders.

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43.	*Ficus racemosa* L.	Rumbal	Tree	Moraceae	Ramnagar, Ravines of Nandani	Leaf, Fruit, Latex	Leaves used in bile infection. Roots used in diabetes and diarrhoea. Fruits stomachic, carminative, used in hemoptysis. Latex used in piles and diarrhoea.
44.	*Ficus religiosa* L.	Bar, Pipal	Tree	Moraceae	Self sown, rare in forest	Bark	Bark infusion given for ulcers and skin infections.
45.	*Flacourtia indica* Merr.	Kakoh	Tree	Salicaceae	Common throughout	Leaf	Leaves astringent, diuretic and vulnerary.
46.	*Fumaria indica* Pugsley.	Pitpapra	Herb	Papavaraceae	Abundant in fields	Whole plant	Dried plant anthelmintic, diuretic, diaphoretic in low fever, used to purify blood and cure skin diseases.
47.	*Gloriosa superba* L.	Charkiara	Climber	Colchicaceae	Sukhetar, Ramnagar, Bantalab	Tuber, Root	Tubers are abortifacient, stimulant and anthelmintic. Used to treat leprosy. Root paste antidote to snake poison.
48.	*Grewia optiva* J.R. Drumm.	Dhamman	Tree	Malvaceae	Common in dry deciduous forest and Kandi belt	Bark, Fruit, Twig	Bark extraction given for smooth delivery and constipation. Bark is used as detergent. Twigs used as fibres to make ropes. Ripe fruits are eaten.
49.	*Helicteres isora* L.	Maror Phalli	Shrub	Malvaceae/Sterculiaceae	Dharangari, Ramnagar	Fruit	Fruit used to cure diarrhoea, dysentery, flatulence and to improve appetite. Also used to cure stomach infections and diabetes. Fruit paste used as antidote for natal disorders.
50.	*Holarrhena antidysentrica* Wall.	Kogar	Tree	Apocynaceae	Rocky hillsides of Janipura and Tanda	Seed, Bark	Seeds used to cure amoebic dysentery and vaginitis. The bark has digestive, tonic and febrifuge properties. Hot decoction cures toothache.
51.	*Indigofera tinctoria* L.	Neel	Shrub	Fabaceae	Waste places in plains	Root	Extracts for epilepsy. Ointment for sores, ulcers, piles. Roots given in urinary disorders and hepatitis.
52.	*Ipomea carica* Sweet.	Akk	Shrub	Convolvulaceae	Common in moist places	Leaf	Soluble extracts purgative. Leaves used with oil to cure wounds.
53.	*Justicia adhatoda* L.	Barenkar	Shrub	Acanthaceae	Abundant, gregarious in Ramnagar & Domel	Leaf	Leaves constitute the drug '*Vasaka*' used in bronchial troubles. Leaf juice is given in diarrhoea, dysentery and glandular tumors.
54.	*Kydia calycina* Roxb.	Pulla	Tree	Malvaceae	Ravines of Nandani & Ramnagar	Leaf, Bark	Leaf paste used to cure body pains.
55.	*Lannea coromandelica* Merr.	Kambel	Tree	Anacardiaceae	Very common in Nandani & Ramnagar	Bark, Fruit	Bark is astringent and is used as lotion to treat toothache and gum trouble. Fruit powder for healing wounds.
56.	*Lantana camara* L.	Panjfulli Jarri	Shrub	Verbenaceae	Gregarious Ramnagar, Mahamaya	Seed	Oil from seeds is used as antiseptic, diaphoretic, carminative and antispasmodic. Decoction is given in tetanus, rheumatism, malaria and for ataxy of abdominal viscera. Infusion of leaves given in eczema.
57.	*Luffa acutangula* Roxb.	Jungli Kandoli	Climber	Cucurbitaceae	Very common in Ramnagar, Khanpur	Fruit, seed	Plant laxative, purgative, reported useful for skin diseases and asthma. Dried fruit used in jaundice. Seeds emetic, expectronant and emulcent.
58.	*Mallotus philippensis* Muell.-Arg.	Kamila, Karangal	Tree	Euphorbiaceae	Shady ravines Ramnagar, Nandani & Kalidhar range	Fruit, Leaf, Root	Fruits anthelmintic, purgative, cathartic, vulnerary, detergent and carminative. Also used to treat bronchitis, spleen enlargement, jaundice and piles. Leaves and roots used to cure skin diseases.
59.	*Malvastrum coromandelianum* Garcke.	Baddi Brear	Herb	Malvaceae	Common throughout	Leaf	Plant decoction given in dysentery. Leaves applied on inflammation, sores and wounds. Flowers diaphoretic.
60.	*Mangifera indica* L.	Amb	Tree	Anacardiaceae	Planted & self-sown Tanda & Tawi plains	Fruit, bark, seed	Fruit laxative, diuretic. Bark astringent, used to cure diptheria and rheumatism. Also used to check uterine hemorrhage, seeds to cure asthma. Fruit preparations used for culinary processes.
61.	*Martynia annua* L.	Bhidoo, Kaun	Herb	Martyniaceae	Gregarious Along road side	Leaf, root	Leaves used to cure epilepsy tubercular glands of neck. Juice to treat sore throat. Fruits are alexeteric.
62.	*Melia azedarach* L.	Dherank	Tree	Meliaceae	Sparse in Ramnagar, Nandani & Kalidhar	Leaf, bark, Fruit	Leaves, bark and fruit insect repellant. Leaf juice anthelmintic, diuretic and emmenagogue. Gum used for spleen enlargement. Bark infusion given in ascariasis.

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63.	*Mentha arvensis* L.	Jungli Poodna	Herb	Lamiaceae	Common along canal	Oil	Oil antiseptic, carminative, refrigerant, stimulant and diuretic. Used to treat liver and spleen diseases, asthma and jaundice.
64.	*Micromeria biflora* Bth.	Jar Juain	Herb	Lamiaceae	Nandani, Jhajjar area	Leaf	Aromatic herb applied on worm infected wounds and stomachache. Leaves used to cure diabetes.
65.	*Mimosa pudica* L.	Chui-Mui, Lajbanti	Shrub	Fabaceae		Leaf	Leaf juice used in dressings for sinus and to cure sores and piles.
66.	*Momordica charantia* L.	Ban Karela	Climber	Cucurbitaceae	Domel, Salora & Nandani	Fruit, Leaf, Root	Fruit regarded as stomachic and carminative. Leaves have purgative, emetic and better properties. Fruit used to cure leprosy, piles and jaundice. Roots possess abortifacient properties.
67.	*Moringa oleifera* Lam.	Sohanjna	Tree	Moringaceae	Ramnagar, Dharangari	Whole Plant	Whole plant is used in treatment of ascites, venomous bites, rheumatism and as cardiac and circulatory stimulant. Roots rubefacient and vesccant. Seeds antipyretic. Flowers, tender leaves and pods are eaten.
68.	*Morus alba* L.	Toot	Tree	Moraceae	Plantation along side road & canal	Leaf, Bark, Root, Fruit	Leaves diaphoretic, roots anthelmintic. Bark purgative and vermifuge. Tea from root to cure diarrhoea. Fruit mild laxative and edible.
69.	*Mucuna pruriens* DC.	Jajooli	Climber	Fabaceae	Sukhetar, Surinsar	Seed, Root	Seeds and roots considered aphrodisiac and diuretic. Also used to treat kidney trouble and dropsy.
70.	*Murraya koenigii* Spreng.	Kari Patta	Shrub	Rutaceae	In shady depressions of Ramnagar, Nagrota	Leaf, Root, Bark	Leaves, roots and bark tonic, stomachic and carminative. Leaves used to cure diarrhoea, dysentery and vomiting. Leaves used for seasoning curry and other food preparations.
71.	*Nerium indicum* Mill.	Lal Gandeela	Shrub	Apocynaceae	Common in Anchar Khad, Sukhetar & Jhajjar belt	Root, Leaf	Twigs used for cleaning teeth. Roots resolvent and attenunant, Root bark oil used in skin diseases of scaly nature. Leaves contain oleandrin, a heart tonic, also used in cutaneous eruptions. Paste of root for hemorrhoids and ulcerations.
72.	*Nyctanthes arbortristis* L.	Kuri, Kurrum	Shrub	Oleaceae	Very common in Nandani, Ramnagar & Jhajjar Kotli	Leaf	Leaves expectronant and used against rheumatism. Leaf juice diaphoretic and diuretic, given to children to expel round and thread worm.
73.	*Oroxylum indicum* Vent.	Tattar, Tat Palng	Tree	Bignoniaceae	In shady ravines of Nandani, Salora	Root bark, Fruit, Seed	Root bark tonic, astringent and useful in diarrhoea and dysentery. Roots diaphoretic cure rheumatism. Fruits refreshing and stomachic. Seeds purgative.
74.	*Ougeinia oogeinensis* Hochr.	Sannan	Tree	Fabaceae	Ramnagar & Nandani	Bark	Bark used as febrifuge and used to cure diarrhoea and dysentery.
75.	*Oxalis corniculata* L.	Ammi Khati	Herb	Oxalidaceae	Bundant in moist shady places	Leaf	Plant used as a cure for scurvy. Leaf juice a good appetizer and used in removing warts. Paste of top shoots with black pepper is applied to boils, abscesses wound and weeping eczema.
76.	*Phoenix sylvestris* Roxb.	Jungli Khajoor	Tree	Arecaceae	Nandani, Mathwar	Root, Fruit, Leaf	Good source of vitamin B & C. Roots used for toothache. Fruits edible.
77.	*Phyllanthus emblica* L.	Amla	Tree	Phyllanthaceae	Abundant throughout	Fruit	Fruit rich source of vitamin C and serve as a cooling astringent, diuretic and laxative. An important ingredient of '*Trifalla'*. Fruits edible used as pickle and *Murraba*.
78.	*Phyllanthus niruri* L.		Herb	Phyllanthaceae	Common in dampy places	Leaf	Leaves used for treatment of jaundice and intermittent fever. Plant used to cure urinogenital diseases.
79.	*Pinus roxburghii* Sarg.	Chir	Tree	Pinaceae	Gregarious in kalidhar, Bamyal.Sparse in Nandani forest	Oil	Yields turpentine oil with several application in pharmaceuticals. Turpen expectronant used in chronic bronchitis and gangrin of lungs. Given as carminative to arrest minor hemorrhage in tooth sockets and nose.
80.	*Pistacia integerrima* Stew.	Kakar Singhi	Tree	Anacardiaceae	Sparse in kalidhar, Surinsar area	Leaf, Fruit	Leaf galls employed in asthma, phthsis and other diseases of respiratory tract. Fruit known as '*kakarsinghi*' is used for stomach ailments.

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81.	*Plantago lanceolata* L.	Gobba, Bhummnu Gha	Herb	Plantaginaceae	Common in wet grassy areas	Seed	Seeds used as local '*Isabgol'* to cure stomach disorders especially for chronic dysenteries of amoebic and bacillary origin.
82.	*Plumbago zeylanica* L.	Chitra	Herb	Plumbaginaceae	Shady places along road side	Root	Roots contain '*plumbagin*' applied as paste to overcome toothache and abscess. Roots promote appetite.
83.	*Premna latifolia* Roxb.	Kaseer	Tree	Verbenaceae	Common in Ramnagar, Nandani forest	Leaf	Leaves diuretic and used in dropsy.
84.	*Punica granatm* L.	Darooni	Shrub	Lythraceae	Common in Nandani, Sukhetar forest Planted & self sown in Kalidhar range	Bark, Fruit, Stem, Root, stem, Seed	Bark is anthelmintic and also used to cure diarrhoea and dysentery. Fruit pulp is cardiac. Fruit juice given to treat leprosy. Seeds used locally as '*anardana*' a rich source of vitamin C used as condiment in food preparations.
85.	*Randia tetrasperma* Blth. & Hk. f.	Rara	Shrub	Rubiaceae	Shady situations in Jhajjar, Surinsar area	Root, Seed	Roots insecticidal and bark sedative.
86.	*Rauvolfia serpentina* L.	Sapgandhi	Herb	Apocynaceae	An under growth of orchards in Gajansu-Marh	Root	Used for treatment of high blood pressure and is used as well as tranquilizer. Roots useful in diseases of bowels and in fever.
87.	*Ricinus communis* L.	Aren, Arind, Areri	Shrub	Euphorbiaceae	Waste places throughout in city / suburbs	Root, Seed	Root decoction given in Lumbago. Oil regarded as classical purgative.
88.	*Rubus ellipticus* Sm.	Akhre	Shrub	Rosaceae	An undergrowth in Kalidhar forest	Fruit	Raspberry used to stake thirst in heat of fever, promotes perspiration and urination.
89.	*Rumex hestatus* D. Don.	Baddi Ammi, Malhori	Shrub	Polygonaceae	Gregarious in wet waste places	Root	Root bark yields tannin. Decoction of root administered to cure veneral diseases.
90.	*Salvia plebia* R. Br.	Samundar Sokh	Herb	Lamiaceae	Throughout, gregarious in dried up ditches	Seed, Leaf	Seeds used to cure menorrhagia, diarrhoea and hemorrhoids. Leaf paste applied on toothache. Plant decoction diuretic, astringent and anthelmintic.
91.	*Sapium sebiferum* Roxb.	Charbi	Tree	Euphorbiaceae	Common along canal/road in Gajansu-Marh	Root	Oil is used for treatment of skin disorders. Decoction of root bark given in dyspepsia.
92.	*Senecio nudicaulis* Buch.-Ham.	Sinreri	Herb	Asteraceae	Common on either side of Nandani tunnel	Plant extract	Plant extract boiled in water given to cure cough and cold.
93.	*Sesamum indicum* L.	Til	Herb	Pedaliaceae	On road side and waste places throughout	Seed	Seed oil possess antioxidant and synergistic properties, also used as emollient and demulcent.
94.	*Solanum nigrum* L.	Kayan Kothi	Herb	Solanaceae	On road side and waste places	Whole Plant	Plant juice given in ulcer and skin diseases. Infusion used to cure dysentery, fever and asthma.
95.	*Solanum surattense* Burm. f.	Kandiari	Herb	Solanaceae	Common perennial of road sides and waste places	Fruit, Root	Fruit tied as garland to relieve jaundice and body swelling. Dried root used in cough, asthma and fever. Plant carminative and diuretic.
96.	*Stellaria media* Vill.	Kakoon	Herb	Caryophyllaceae	Moist and shaded habitats	Flower	Flowers used for eye infections and hemorrhoids. Poultice used to treat ulcers and skin sores.
97.	*Swertia angustifolia* Buch.-Ham.	Vis Kappra	Herb	Gentianaceae	Common in open grassy slopes in Nandani	Whole plant	Whole plant used as blood purifier and febrifuge.
98	*Syzygium cuminii* Skeels.	Jamoon, Dallan	Tree	Myrtaceae	Common in Nandani and Sukhetar forests	Bark, Fruit	Fresh bark juice with milk used to cure diarrhoea. Bark and seed extract given for diabetes, bronchitis, asthma and ulcers. Fruits edible.
99.	*Taraxacum officinale* Weber	Phul Dudli	Herb	Asteraceae	Roadsides in Mandleek ka Mera area	Root, Leaf	Plant juice affective against liver diseases, chronic hepatitis, visceral congestion, intermittent fever and hypochondria. Roots to increase urine flow, laxative and stimulate appetite.

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100.	*Terminalia bellerica* Roxb.	Bahera	Tree	Combretaceae	Sparse in Uttarbahini, Kot-Bhalwal area, mostly planted	Fruit, Bark, Gum, Seed	Ripe fruit used as astringent, purgative and is applied in rheumatic swellings. Bark diuretic and gum of tree demulcent and purgative. Seeds edible. A useful ingredient of '*Trifalla'*.
101.	*Terminalia chebula* Retz.	Harad, Hareer	Tree	Combretaceae	Abundant in Mathwar, Nandani beyond tunnel, mostly planted	Fruit, bark	Fruits laxative, stomachic, tonic and also used in pulp as denitrifrices. Coarsely powdered fruit is smoked in asthma. Bark diuretic and cardio tonic. Fruit important ingredient of '*Trifalla'*.
102.	*Tinospora cordifolia* Hook. F. & Th.	Gloe	Climber	Menispermaceae	On trees in Ramnagar, Dharangari and Nandani forests	Stem, Bark, Root	Dried stem and bark tonic, antiperiodic and aphrodisiac. Starch of roots and stems nutritious and are used to cure diarrhoea.
103.	*Toona ciliata* M. Roem.	Tooni, Tun, Tunu	Tree	Meliaceae	Planted throughout, run wild in Nandani	Bark	Bark used for chronic dysentary of infants and in ulcers also.
104.	*Tribulus terrestris* L.	Pakhrra	Herb	Zygophyllaceae	Common in Kandi belt	Leaf, Fruit, Root	Plant diuretic, tonic, aphrodisiac. Decoction of leaves given in toothache, painful gum and to reduce inflammation. Fruits used in urinogenital disorders. Roots stomachic appetizer, diuretic and carminative.
105.	*Trichosanthes cucumeriana* L.	Padol, Chinchida	Herb	Cucurbitaceae	Wild in Nandani	Seed, Leaf	Seeds stomachic and anthelmintic. Leaf juice prugative and expectorant.
106.	*Typha elephantina* Roxb.	Aera, Pater	Herb	Typhaceae	On dry beds of seasonal Khads	Rhizome	Rhizome astringent, diuretic given against dysentary, gonorrhoea and measles.
107.	*Uraria picta* Desv.	Dabra	Herb	Fabaceae	Common on rocky slopes in Kandi belt	Root, Leaf	Important component of 'Dashmoola'. Root decoction given in coughs, chills and fevers. Leaves antiseptic used in gonorrhea.
108.	*Urginea indica* Kunth.	Ban Ganda	Herb	Asparagaceae	Abundant in dry deciduous forest	Bulb	Bulbs used to cure heart ailments, cough, bronchitis and for promoting urination. Also employed in dropsy, rheumatism and skin warts.
109.	*Verbascum thapsus* L.	Giddar Tambaku	Herb	Scrophulariaceae	Common throughout along fields and in waste places	Leaf	Leaves smoked for asthma and sore throat. Infusion orally given to cure snakebite. Tea prepared from leaves to treat cold and dysentery. Leaves locally applied on inflammations, hemorrhoids and sunburn.
110.	*Verbena officinalis* L.	–	Herb	Verbenaceae	On wastelands		Stomachic, antispasmodic, astringent, also used to cure cellular effusion, jaundice, ulcers opthalmia and pleurisy, prevents miscarriage.
111.	*Viola canescens* Wall.	Baneksha	Herb	Violaceae	Common in moist shady places	Root	Tops and roots laxative, poultice applied to skin abrasions.
112.	*Vitex negundo* L.	Bana	Shrub	Lamiaceae	Planted near roadside and along fields	Fruit, Leaf	Fruits cooling, anodyne and tonic. Used for chest diseases. Kernels sedative, soporific, antidote to aconite poisoning and abdominal pain in pregnancy. Leaves astringent and contraceptive.
113.	*Withania somnifera* Dunal	Sagunn	Herb	Solanaceae	Common in Bahu-Mahamaya range	Root, Fruit	Root aphrodisiac, tonic and diuretic. Useful in sexual weakness and rheumatism, promotes urination, acts as narcotic and removes functional obstruction of body. Root powder applied on ulcers and inflammation. Fruits diuretic.
114.	*Woodfordia fruitcosa* Kurz.	Dhai, Dhoe	Shrub	Lythraceae	Along the rocky slopes throughout	Leaf, Root, Flower	Leaves tonic and vermifuge, smoked for relief in catarrh and headache. Leaves and roots tranquilizer. Leaf extract show anticancer activity. Flowers astringent used in fever and liver complaints.
115.	*Wrightia tomentosa* R. & S.	Dudhat, Khlawa	Tree	Apocynaceae	Sporadic occurrence in dry deciduous forest	Leaf, Flower, Seed, Root, Stem	Juice used to cure hemorrhage, fever and toothache. Leaves and tender flowers are edible. Seeds and roots yield yellow dye. Stem and root bark act as antidote to snake and scorpion bite.
116.	*Xanthium strumarium* L.	Jajora	Herb	Asteraceae	Common weed of wastelands	Leaf	Mature leaves used to treat skin and bladder infections, to stop bleeding from cuts and abrasions, neck gland tuberculosis and herpes.
117.	*Zanthoxylum armatum* L.	Timbru, Tirmira	Shrub	Rutaceae	Sparse in Nandani-Domal area	Stem, Leaf, Fruit	Stem used as toothbrush and mouth purifier. Leaves and fruits are chewed in teeth enamel diseases. Berries considered stimulant, tonic, antirheumatic and also used to cure muscle spasms and chest ailments. Also used in making "chutneys".
118.	*Zinyphus mauritiana* Lam.	Berri	Tree	Rhamnaceae	Commonest of the trees in Kandi belt	Flower	Commercially available drug consists of dried floral parts used in bowel complaints, hemorrhages, menorrhagia and seminal weakness.

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