Therapeutic Survey of Wild Medicinal Flora of Soan River, Rawalpindi, Pakistan

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Abstract—*Medicinal plants are worth for human civilizations for treating syndromes. The current study was conducted to document the unexplored medicinal flora of Soan River, Rawalpindi. Data was collected by braun-blanquet approach in which quadrats of 1×1 m^2 were laid down, GPS coordinates were recorded, local people and hakims were interviewed. Total of 35 species belonging to 20 different families were collected. Medicinal plants were used as carminative, tonic, decoctation, anti-hysteric & anti-amoebic, astringent, diaphoretic, diuretic and emollient etc. People living along Soan River are still utilizing medicinal flora. Anthropogenic activities, lack of awareness and over exploitation of medicinal flora is posing threat to medicinal plant diversity. The present study will highlight the therapeutic uses of medicinal flora of Soan River and will be helpful in conserving declining herbal community.*

Keywords—Ethano-botanical uses, Herbal medicinal uses, Soan Valley, Traditional medicinal uses, Therapeutic uses.

I. INTRODUCTION

As the human life started on earth, health issues were began to originate. For dealing with such issues, human had searched for the remedies. Human civilizations had utilized the plants growing around them for various purposes. Vernacular use of medicinal plant had resulted in the formation of modern medicine in pharmaceutical world [1]. About 50,000 angiosperms are used all over the world for medicinal purposes[2,3]. With the development of synthetic drugs, human folks are still showing their interest in developing knowledge about the therapeutic uses of medicinal plants [4].According to WHO, in modern pharmaceutical world, the prescribed medicines are extracted from synthetic compounds present in medicinal plants [5]. Medicinal plants are preferred over synthetic drug because of their cost effectiveness, easy usage and minimum side effects [6].

In developing countries, where income is very small, more than 80 % people use medicinal plants for curing diseases. In Pakistan, most of the tribes are still using indigenous flora for treating their ailments. The traditional knowledge about medicinal flora is transferred from generations to generations and practiced in almost 48% homes[7,8,9]. These medicinal plants in Pakistan are either usually used by hakims or by some herbal industries[10]. Due to over exploitation of medicinal flora and lack of medicinal uses inventory, it might be possible that the traditional knowledge will be lost in few years .Deforestation, heavy grazing, wrong method of picking medicinal plant and use of medicinal plants for fuel purposes, are some other threats which are responsible for declining population of medicinal plants.

Keeping in view of importance of therapeutic uses of medicinal flora, a study was carried out along Soan River, Rawalpindi. Ahmad et al (2012) identified medicinal flora of some areas of Soan valley (Khabeki, Khoora, Dape Sharif, Anga, Knotti Garden and Jallar) was threatened due to anthropogenic activities in Salt range, loss of biodiversity and over harvesting of medicinal plant species [11]. The present study was conducted:

- To document the existing indigenous medicinal flora of Soan river, Rawalpindi used by native people for therapeutic purposes
- To ascertain the importance of medicinal flora by collecting local medicinal species and recording them for future use

II. MATERIALS AND METHODS

2.1. **Study Area:** The Soan river lies between Longitude 71º 45’ to 73º35’ and Latitude 32º45’ to 33º 55’. This river being the part of Potawar region lies on left bank of Indus tributary [12]. It originates from Murree Hills, passing through steep slopes enter Chirah. The river crosses Fateh Jung, Pindi Ghab, Talagang, Mianwali and finally falls in the Indus River near Kalla Bagh. The total length of river is 274km[13,14,15]. The area was surveyed from Pindi Ghab to Sihala for the collection of indigenous plant samples.

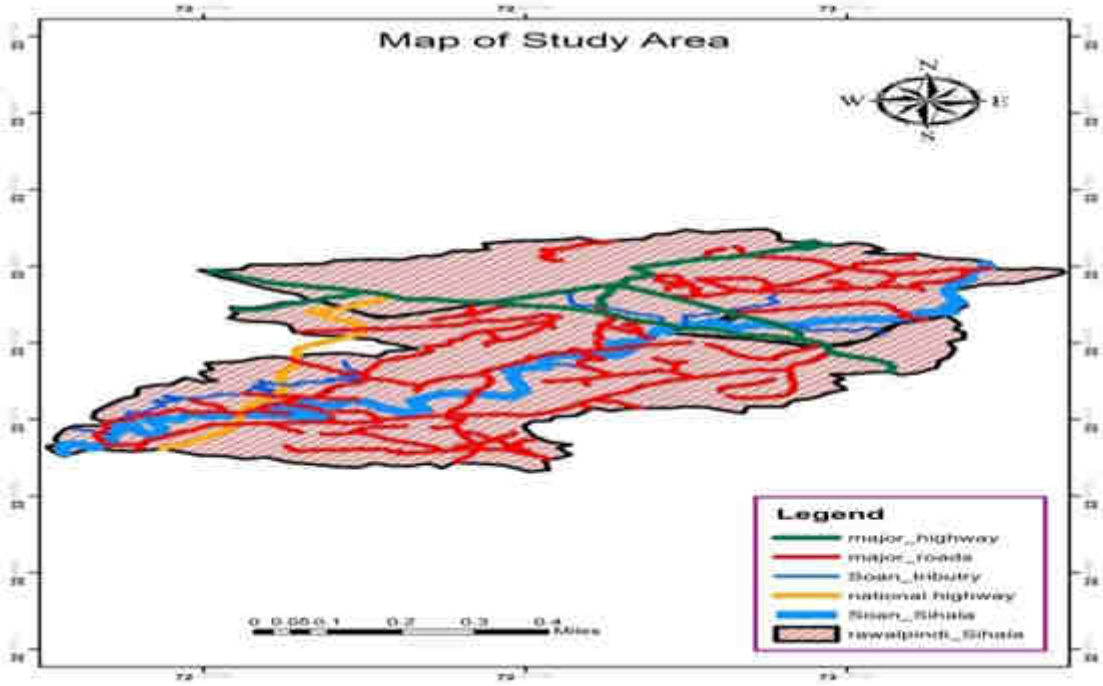

Fig 1: Map of study area (Soan River Rawalpindi-Soan River Sihala)

2.2. **Collection of Medicinal flora:** The survey was carried between October and November 2015. Data was collected using Braun-Blanquet approach. Quadrats of 1×1 m^2 were laid down. Random sampling was done to get medicinal flora. Total 40 quadrats were laid down and for every quadrat, GPS coordinates were recorded. 35 plant samples were collected.

2.3. **Documentation of Data:** Hakims, local herb dealers and local residents were consulted on the spot for documenting medicinal flora. Questions were asked in native language for the ease of local residents.

2.4. **Data preservation:** Plant samples were dried, pressed and preserved using Standard Herbarium technique.

2.5. **Binomial nomenclature:** Binomial nomenclature was used for assigning names to medicinal flora.

2.6. **Data Identification:** Data was identified using Flora of Pakistan by Nasir and Ali (1992-2002), Ahmed *et al.* (2012) and Riffat *et al*. (2012) [11, 16, 17].

III. RESULTS

Total 35 plant samples were collected out of which 31 plant samples have therapeutic uses. These 31 plant species are utilized as medicinal herb in Soan valley by hakims.

Table.1: Therapeutic uses of identified plants

Sr. No	Plant Name	Family	Vernacular Name	Therapeutic Uses
1.	*Justicia adhatoda* L.	Acanthaceae	Adusa, Bansa	Utilized for treating gastro-intestinal disorders, bronchitis, asthma, fever and jaundice
2.	*Amaranthus spinosus* L.	Amaranthaceae	Chalwaey	Seed of plant is applied for as plaster on broken bones. Plant has astringent, diaphoretic, diuretic, febrifuge, galactogogue, and emollient properties. Herb is used for stop internal bleeding, diarrohea and excessive menstruation. Plant is also used

				for treating snake bite. Plant is applied externally to treat wounds, nose bleeds, vaginal discharges and ulcerated mouths. Roots are grinded and smooth paste is formed to treat menorrhagia, gonorrhoea, eczema and colic. Root juice is applied to treat fevers, urinary troubles and dysentery. Sap of Plant is utilized as an eye wash to cure ophthalmic and convulsions in children.
3.	*Parthenium hysterophorus* L	Asteraceae	Gajjar ghas	It has stimulating, anti-hysteric & anti-amoebic properties. Decocted roots are used to cure dysentery neuralgia and some types of rheumatism
4.	*Conyza bonariensis* (L.) Cronq.	Asteraceae	Paleet	Applied as homeostatic, stimulant, astringent and diuretic. Plant is used for curing dysentery, diarrhoea and haemorrhage
5.	*Erigeron annuus* L	Asteraceae	NA	Applied as hypoglycemic drug for treating diabetes. Plant has diuretic properties and is used for treating digestive disorders.
6.	*Cannabis sativa* L.	Cannabaceae	Bhang	Applied to cure malaria, black water fever, blood poisoning, anthrax and dysentery.
7.	*Lepidium apetalum*	Cruciferae	NA	Seeds of plant are anti-asthamatic, anti-tussive, diuretic, cardio-tonic & purgative. Decocted leaves are applied to cure asthma, cough, nausea, pleurisy & oedema. Mixture of decocted roots with other herbs is used as expectorant.
8.	*Cyperus rotundus* L.	Cyperaceae	Deela , motha	Utilized for curing thirst, fever, ulcers, sores, vomiting, eye inflammation, itching. Plant has anti-inflammatory, anti-pyretic, anti-emetic & muscle relaxant properties.
9.	*Cyperus glomeratus* L.	Cyperaceae	Gol ghas	Utilized as Anti-inflammatory
10.	*Euphorbia hirta* L.	Euphorbiaceae	Dodhe	Plant is grinded and mixed with water to cure diarrhea. Plant has laxative properties, purifies blood for treating bile. Milky vertex, secreted by plants is used for treating pre-mature ejaculations.

				Plant is also used for curing measles.
11.	*Euphorbia prostrate* Cuit	Euphorbiaceae	Doodi Buit	Used as dermatocides, anti-diarrhea and for curing skin disease.
12.	*Crotalaria medicaginea*	Fabaceae	Jhojhru	Applied for curing white discharge, snake bite and babesiosis
13.	*Leucas capitata*	Lamiaceae	Goma Buti	Applied for treating Cold, cough, snake bite, scabies
14.	*Ocimum basilicum* L.	Lamiaceae	Niazbo	Used as antidepressant antiseptic, stimulant, antiperiodic, diaphoretic, carminative, diuretic, demulcent, aromatic, and expectorant
15.	*Lemna minor*	Lemnacaeae	Chetri	Applied to treat measles, fever and help in phagocytosis
16.	*Malvastrum coromendelianum* (L.)Garcke	Malvaceae	motufu lau talatala	Used as aphrodisiac, emollient, Inflamed sores, & in Dysentery
17.	*Corchorus capsularis* L.	Malvaceae	Rasi	Utilized for treating treat gastrointestinal disorders, fever, constipation, constipation, dysentery, liver disorder and dyspepsia
18.	*Corchorus olitorius* L.	Malvaceae	Saluyut	Applied for curing gonorrhoea and dysuria, preventing wrinkles, controlling headache, arthritis, stomach ache, control blood pressure, cholesterol build-up, diabetes and heart disease
19.	*Oxalis corniculata* L.	Oxalidaceae	Khat Kurla	Used as astringent, treats dysentery diarrhea, skin diseases & fevers. Applied externally to confiscate warts and opacities of the cornea
20.	*Oenothera rosea*	Onagraceae	Seh Davi	Used for minimizing thrombosis, menopause & other degenerative diseases.
21.	*Cynodon dactylon* L.	Poaceae	Dhab	Utilized for curing headache,

				treating small pox, for expelling poison from patients' body. Plant is used as emetic and carminative
22.	*Setaria glauca* L.	Poaceae	Lumar Ghas	Used as astringent, digestive, emollient and stomachic.
23.	*Saccharum spontaneum* L.	Poaceae	Kahi	Used as astringent, emollient, refrigerant, tonic, diuretic, lithotriptic, purgative, aphrodisiac. Utilized for curing dyspepsia, burning sensation, piles, sexual weakness, gynecological troubles & respiratory troubles
24.	*Dactyloctenium aegyptium* L.	Poaceae	Madhana Ghass	Used as healer.
25.	*Imperata cylindrical* (L.) Raeusch	Poaceae	Kulfi Ghas	Utilized as Diuretic, astringent, febrifuge, styptic, antibacterial, antifungal & tonic
26.	*Polygonum barbatum* L.	Polygonaceae	Ak	Used as carminative, astringent & have cooling effects
27.	*Portulaca oleracea* L.	Portulacaceae	Woorkhora	Utilized as antibacterial, anti-inflammatory, anthelminthic.
28.	*Salix babylonica*	Salicaceae	Beiss	Used for alleviating pain
29.	*Dodonaea viscose* (L.) Jacq	Sapindaceae	Samath	Leaves have febrifugal properties and are used as astringent, for healing wounds and for curing rheumatisms.
30.	*Solanum nigrum* L.	Solanaceae	Mako	Diuretic, laxative and used to cure diseases of heart, ear, nose & eye, in pain, piles inflammation
31.	Lantana camara L	Verbenaceae	NA	Applied for curing measles, chicken pox, rabies, skin itches and ulcers. Plant strains are used in curing tuberculosis and asthma.

IV. DISCUSSIONS

In Pakistan, 70% population is living in rural areas. Due to lack of health care centers and low income, people mostly rely on herbal medicines [18,19].Pakistan has large herbal medicinal diversity consisting of 372 herbal species which are later utilized for synthesizing pharmaceutical medicines [20,21].These herbal medicines are used by local folks to treat fever, cough, asthma, digestive disorders, tuberculosis and heart disease etc. It was observed that out of 35, 31 herb species were identified as medicinal herbs. These 31 herb species belongs to the families of Acanthaceae (1),

Amaranthaceae (1), Asteraceae (3), Cannabaceae (1), Cruciferae (1), Cyperaceae (2), Euphorbiaceae (2), Lamiaceae (2), Lemnacaeae (1), Malvaceae (3), Oxalidaceae (1), Onagraceae (1), Poaceae (5), Polygonaceae (1), Portulacaceae (1), Salicaceae(1), Sapindaceae (1) , Solanaceae (1) & Verbenaceae (1).

Table.2: Major plant families and their respective number of species

Dominant families	No. of plant species
Asteraceae	3
Cyperaceae	2
Euphorbiaceae	2
Lamiaceae	2
Malvaceae	3
Poaceae	5

On the basis of dominant herb families percentage of dominant families was calculated (Fig 2)

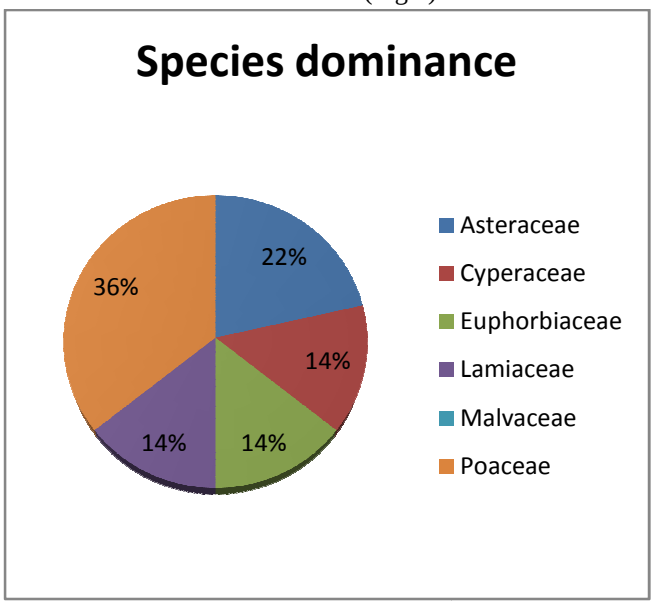

Fig.2: Percentage of medicinal species dominance in Soan Valley

Most of the herbal species recorded from the Soan Valley having therapeutic uses were in accordance with Ahmad (2007), Mahmood et al., (2011) and Ikram et al., (2014) [22,23, 9]. The plants identified in Soan Valley are used as Diuretic, laxative, tonic, antibacterial, anti-inflammatory, anthelminthic, astringent, anti-fungal, anti-asthamatic, emollient, lithotriptic, purgative antirheumatic, carminative and aphrodisiac etc. Whole plant, leaves, stem, roots and seeds are applied in form of plasters, extracts, powder and mixture. The plants are mostly used in dried form but some plants like *Ocimum basilicum* L are used in fresh form.

The therapeutic knowledge documented in present study was obtained from interview from local people, hakims and herbal drug dealers. The knowledge of herbal medicines is now only restricted to hakims or old people due to lack of transmission of knowledge to younger generation, better medical facilities and exploitation of indigenous flora[23,24].

V. CONCLUSION

Soan Valley is contributing to diverse herbal medicines. Due to lack of transmission of knowledge to younger generations, over-exploitation, population pressure, changes in rainfall pattern, over grazing, deforestation and no new cultivation herbal species are threatened. Indigenous population must be bestowed with awareness for conservation and preservation of herbal species.

REFERENCES

[1] T. Aburjai, M. Hudaib, R. Tayyem, M. Yosef, and M. Qishawi, “Ethnopharmaco- logical survey of medicinal herbs in Jordan, the Ailoun Heights region”. J. Ethnopharmacol, vol. 110, pp. 294–304, 2007.

[2] R. Govaerts, “How many species of seed plants are there?” Taxon, vol.50, pp.1085–1090, 2001

[3] U. Schippmann, D.J. Leaman, and A.B. Cunningham, “Impact of Cultivation and Gathering of Medicinal Plants on Biodiversity: Global Trends and Issues”. In Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries. Satellite Event on the Occasion of the Ninth Regular Session of the Commission on Genetic Resources for Food and Agriculture. FAO, Rome, 2002.

[4] N.R. Farnsworth, “Ethnopharmacology and future drug development: the North American experience”. J. Ethnopharmacol. vol.38, pp.145-152, 1993

[5] S.M.K. Rates, “Plants as a source of drugs”. *Toxicon*, vol.39, pp. 603–613, 2001.

[6] K.P. Acharya, R.P. Chaudhary, and O.R. Vetaas, “Medicinal plants of Nepal: Distribution pattern along an elevational gradient and effectiveness of existing protected areas for their conservation”. Banko Jankari, Vol. 19, iss.1, pp. 16-22, 2009.

[7] A. Mahmood, A. Mahmood, and A. Tabassum, “Ethnomedicinal survey of plants from District Sialkot, Pakistan”. J. App. Pharm, vol.02, pp. 212–220, 2011a.

[8] A. Mahmood, A. Mahmood, H. Shaheen, R.A. Qureshi, Y. Sangi, and S.A. Gilani, “Ethnomedicinal survey of plants from district Bhimber Azad Jammu

and Kashmir, Pakistan. J. med. Plant Res, vol. 5, pp. 2348–2360, 2011b.

[9] A. Mahmood, R.A. Qureshi, A. Mahmood, Y. Sangi, H. Shaheen, I. Ahmad, Z. Nawaz, "Ethnobotanical survey of common medicinal plants used by people of district Mirpur, AJK, Pakistan". J. med. Plant Res, vol. 5, pp. 4493–4498, 2011c

[10] A. Mahmood, R.N. Malik, Z.K Shinwari, and A. Mahmood, "Ethnobotanical survey of plants from Neelum, Azad Jammu & Kashmir, Pakistan". Pak. J. Bot, vol.43, pp.105-110, 2003

[11] I. Ahmad, M. Hussain, A. Rehman, I. Mustafa, M. Farooq, S. Jabeen, and S. Zafer, "Threats to medicinal plant diversity in Soon Valley (Salt Range) of Punjab, Pakistan". Int. Res, vol.1, iss. 4, pp. 157-169, 2012

[12] F. Hussain, A. Khaliq, M.I. Ashraf, and I.A. Khan, " Morphological and Hydrological responses of Soan and Khad rivers to impervious land use in district Muree, Pakistan". J. Agric. Res, vol.52, iss.2, pp.269-282, 2014.

[13] S.Z. Hussain, R.N. Malik, M. Javiad, and S. Bibi, "Ethonobotanical properties and uses of Medicinal Plants of Morgah Biodiversity Park, Rawalpindi". Pak. J. Bot, vol. 40, iss.5, pp. 1897-1911, 2008

[14] F. Iqbal, M. Ali, A. Salam, B.A. Khan, S. Ahmad, M. Qamar, and K. Umer, "Seasonal Variations of Physico-Chemical Characteristics of River Soan Water at Dhoak Pathan Bridge (Chakwal), Pakistan". Int. J. Agr. Biol, vol. 6, iss.1, pp.89-92, 2004.

[15] A. Jehanzeb, "Evaluation of flooding hazards of Soan river in Rawalpindi area", M.Sc. Thesis, CEWRE, University of Engineering and Technology, Lahore, pp. 32-56, 2004

[16] S.I. Ali, and M. Qaiser, "Flora of Pakistan". Department of Botany, University of Karachi, Karachi. No. 194-217, 1992-2009

[17] N.M. Riffat, Z.K. Shinwari, and H. Waheed, "Linkages between spatial variations in riparian vegetation and floristic quality to the environmental heterogeneity -A case study of River Soan and its associated streams, Pakistan". Pak. J. Bot, vol. 44, pp. 187-197, 2012

[18] P. Manandhara, "The percentage of medicinal wild species in Himalayan ranges". Pak. J. Bot, vol.10, pp. 65–74, 1987.

[19] B. Konno, "Integration of Traditional Medicine with Modern medicine". EHNRI, Addis Ababa, pp. 3–9., 2004

[20] S.S. Ahmad, and S.Z. Husain, "Ethno-medicinal survey of plants from salt range of Pakistan". *Pak. J. Bot*, vol.40, pp.1005–1011, 2008.

[21] M. Ullah, M.U. Khan, A. Mahmood, R.N. Malik, M. Hussain, S.M. Wazir, M. Dauod, and Z.K. Shinwari, " An ethnobotanical survey of indigenous medicinal plants in Wana district South Waziristan agency, Pakistan". J. Ethnopharmacol, vol. 150, pp. 918-924, 2013

[22] Ahmad, S.S. 2007. Medicinal wild plants from Lahore-Islamabad Motorway (M-2). *Pak. J. Bot*., 39(2): 355-375

[23] S. Ikram, K.H. Bhatti, and M. Parvaiz, "Ethnobotanical studies of aquatic plants of district Sialkot, Punjab (Pakistan)". J. medicinal Plants Stud, vol. 2, iss.1, pp.58-63, 2014.

[24] M. Qaiser, S. Farooq, S.N. Gilani, M.A. Wasim, M. Kakar, S.W.A. Shah, and A. Rauf, "Ethnobotanical Survey of Medicinal Plants Used in Wazir and Daur Tribes of North Waziristan, Pakistan". G. V ,vol. 11, iss.3, pp. 285-292, 2013