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Ethnomedicinal studies on aquatic plants of tehsil Shakargarh, Punjab, Pakistan

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Abstract

The present work was aimed to conduct the ethnobotanical studies of aquatic flora of Tehsil Shakargarh, Punjab to record their medicinal uses through discussions with the local people especially medicinal healers. Regular field surveys were made to collect aquatic plants and interviews of local people and medicinal healers were carried out during October 2015- April 2017. The basic information on the uses of conventional medicinal plants was documented. A total of 42 plant species belonging to 32 families were found ethno medicinally important, to cure different human disorders and diseases, i.e. skin problems, asthma, gonorrhoea, ulcer, stomach pain and piles. Different plant parts such as seeds, roots, stems, barks, leaves, flowers, fruits, and seeds were being used for the preparation of herbal medicines. The study area encompasses plenty of aquatic habitats, which are commonly inhabited by a variety of aquatic plants. A little work has been carried out on these hydrophytes. Thus, there is a need to carry out an ethnomedicinal study on these plants.

Keywords: ethnomedicinal, aquatic flora, shakargarh, traditional knowledge

1. Introduction

The aquatic plants are the important components of wetlands ecosystem, maintaining the species diversity and are the source of various traditional medicines, food and shelter for aquatic animals and water fowls ^[1].

The study area, Shakargarh Tehsil of Narowal District, Punjab lies between 32° 2' and 32° 30' N and 74° 57' and 75° 23' E (Fig. 1) and spreads over an area of 312915 square acres (1260 Km²) with a forested area of 6777 acres ^[2]. The highest temperature during winter may fall to 4 °C. June and July are the hottest months, while October and March are with pleasant weather conditions. The annual rainfall, as per Punjab Development statistics, 2000 is 1000 mm with highest rainfall from July to September. The land is usually plain and fertile. The soil is sandy loam clay and the sources of water are Baen and Basenter (Small water drains) and the river Ravi. The most important crops and fruits of Tehsil Shakargarh are wheat, rice, guava, citrus and mango ^[2].

Hydrophytes act as significant treasure for the human health, especially in the developing countries ^[3]. Indigenous people use medicinal plants either singly or in combinations for various ailments without any side effects ^[4]. Almost 80% of the world population depends on the traditional system for health care ^[5]. About 600 traditional medicinal plants are reported from Pakistan that is used for the treatment of both animal and human ailments ^[6]. A number of ethnobotanical studies have been carried in Pakistan ^[7].

Sardar and Khan ^[2] provided ethnobotanical information on 102 plant species of remote villages of tehsil Shakargarh. The documentation on the hydrophytes i.e. the natural wealth of this area has been ignored, even in the district gazetteer of Government of Pakistan. Therefore, the present study was planned to record the traditional knowledge on the uses of medicinal aquatic plants of the study area.

2. Materials and Methods

2.1 Surveys and collection of plant material

Various visits of the whole Tehsil Shakargarh were made to survey the aquatic sites, including wetland of nullah Baen, nullah Ujh, nullah Hodl, nullah Karari and nullah Basenter (such as slow-running water, sides of stagnant ponds, paddy fields, monsoon rainy streams, sewage channels, marshy places and small water bodies) as well as the adjacent areas of river Ravi

from October 2015 to April 2017. The plants were collected from the wetland and identified with the help of online forums and literature i.e. flora books etc. [18, 9].

2.2 Interviews with local inhabitants

The data on medicinal plants was recorded by interviewing through a questionnaire 45 local informers, including 25 females and 20 males (Table 1). Hakims, Tabibs and Pansars (store-keepers of useable preserved medicinal plants) were given priority because of their interest as they in medicinal properties and proper usage of local plants. Data were gathered on different aspects by asking questions about the medicinal plants, its local names, used parts and how these parts utilized for which diseases treatment. The interviewer were asked questions in Punjabi and Urdu because ease of local inhabitants which are uneducated and English language is not logical in most cases.

Table 1: Meetings with local inhabitants of tehsil Shakargarh, Punjab, Pakistan

Age groups (year)	Numbers of interviewees
58-63	20 males
40-55	25 females
Total	45

3. Results

A total of 42 plant species belonging to 32 families i.e. Cyperaceae (4 plant species) followed by Potamogetonaceae and Potederiaceae (3 plant species in each) were found in frequent use as medicinal plants in the study area (Table 2). Different parts of plants such as seeds, roots, stems, barks, leaves, flowers, fruits, and seeds, even sometimes entire plant

was found in use for the preparation of herbal medicines. Most of the plants were reported useful for the treatment of skin infections and digestive disorders. The study revealed that 35% plants were in use as a whole plant, while leaves 33% as leaf 4% each as stem, rhizome and seed, respectively, etc. (Figure 2). About 60 % of the local medicinal plants are native, while 40% are alien being good to cure different disorders and diseases such as skin problems, gonorrhea, asthma, ulcer, stomach pain and piles (Table 2).

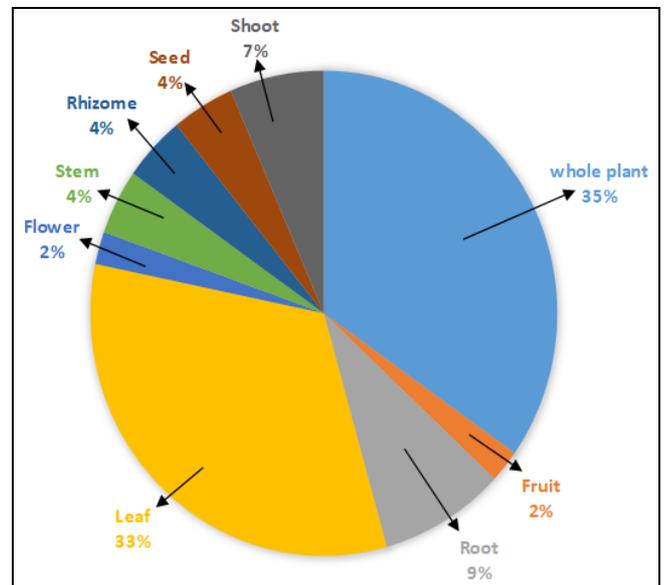


Fig 1: Percentage of plant parts of different species used by local people for the treatment of different ailments.

Table 2: List of ethnomedicinal uses of the hydrophytes of tehsil Shakargarh Punjab, Pakistan

Sr. #	Botanical name	Common Name	Family	Status in Pakistan	Part Used	Medicinal Uses
1	<i>Alisma triviale</i> Pursh.	Common Water-plantain	Alismataceae	Alien	Whole plant	Used for the treatment of dysentery, dropsy, fatigue and gonorrhoea also used to lower cholesterol, blood pressure, and blood sugar levels.
2	<i>Adiantum capillus-veneris</i> L.	Maiden hair fern	Adiantaceae	Alien	Leaves, rhizome	Used for the treatment of kalbtara, cough, fever, diuretic and irregular menstrual cycle.
3	<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Alligator weed	Amaranthaceae	Alien	Fresh shoot mostly young tendril	Used for the treatment of stomach and liver problems and injuries.
4	<i>Alternanthera sessilis</i> L.	Sessile joy weed	Amaranthaceae	Native	Whole plant	Used for the treatment of asthma, eyes, skin and urine problems and in hemoptysis.
5	<i>Pistia stratiotes</i> L.	Water lettuce	Araceae	Native	Leaves	Used for the treatment of ring worm and other skin disease. Also used as Anti-inflammatory, anti-arthritis and for fresh and old wound healing and to cure headache.
6	<i>Eclipta prostrata</i> (L.) L.	False daisy	Asteraceae	Alien	Whole plant	Improves hair growth and color and prevents loss of hair. Used as antidote for scorpion, snake stings, antiseptic, athlete's foot and in wound healing.
7	<i>Azolla pinnata</i> R.Br.	Mosquito-fern	Azollaceae	Native	Whole plant	Used as antimicrobial (anti-inflammatory and anti-allergic)
8	<i>Nasturtium officinale</i> W.T. Aiton.	Water cress	Brassicaceae	Native	Leaves	Used for the treatment of allergic problems and as diuretic, tonic to recover health and strength.
9	<i>Ceratotophyllum demersum</i> L.	Coon tail	Ceratophyllaceae	Native	Leaves	Used for the treatment of biliousness and act as cardiac tonic.
10	<i>Ipomoea carnea</i> Jacquin.	Bush Morning Glory	Convolvulaceae	Alien	Leaves	Applied on abscessed boils
11	<i>Ipomoea equatica</i> Forssk.	Swamp morning-glory	Convolvulaceae	Native	Whole plant shoot	Used for the treatment of ringworm, indigestion, ear-ache and kidney problem.
12	<i>Cyperus rotundus</i> L.	Purple nut sedge	Cyperaceae	Native	Root tubers	Used as brain and heart tonic and for digestive problems.
13	<i>Cyperus digitatus</i> Roxb.	Finger flatsedge	Cyperaceae	Native	whole plant	Used for the treatment of allergic problems.
14	<i>Eleocharis palustris</i> (Linn.) R. Brown	Spike-rush	Cyperaceae	Native	Root and stem	Used for liver and abdominal problems.

15	<i>Scirpus macronatus</i> (L.) Palla	Rice field bulrush	Cyperaceae	Native	Root tubers	Used for digestive problems, to stop vomiting and diarrhea.
16	<i>Equisetum debile</i> Roxb	water horsetail	Equisetaceae	Native	Whole plant	Used for the treatment of arthralgia, alopecia and kidney ailments.
17	<i>Centaurium pulchellum</i> (Sw.) Druce	Lesser Centaury	Gentianaceae	Native	Flower	Used as antiseptic and anti-inflammatory. Also, for appetite loss and to stop vomiting.
18	<i>Hydrilla verticillata</i> (L.F.) Royle	Hydrilla	Hydrocharitaceae	Native	Whole plant	Applied for the treatment of abscesses and boils and for wound healing.
19	<i>Vallisneria spiralis</i> L.	Tape grass	Hydrocharitaceae	Alien	Leaves	Treatment of leucorrhoea and women's other complaints.
20	<i>Lemna minor</i> L.	Duckweed	Lemnaceae	Native	whole plant	Used for the treatment of urine problems and skin diseases such as measles.
21	<i>Mentha spicata</i> L.	Spearmint	Lamiaceae	Alien	Leaves	Useful for digestive problems, helping in digestion and antispasmodic.
22	<i>Marsilea minuta</i> L.	Pepper wort	Marsilaceae	Alien	Leaves, seed	Applied on boils and burns and used for snake bite.
23	<i>Nelumbo nucifera</i> Gaertn	Lotus	Nelumbonaceae	Native	Whole plant	Used for the treatment of digestive problems such as vomiting diarrhea, cholera, piles, as liver tonic.
24	<i>Nymphaea nouchali willd</i>	Water lily	Nymphaeaceae	Native	whole plant	Used for restlessness, irregular menstruation, jaundice, piles, diarrhea, gastric and intestinal disorders, and eye infections.
25	<i>Ludwigia adscendens</i> (L.) Hara	Water primrose	Onagraceae	Native	Whole Plant, leaf	Used for aching gums and skin problems.
26	<i>Oxalis corniculata</i> L.	Creeping wood sorrel	Oxalidaceae	Alien	whole plant	Liver and stomach tonic. Used as diuretic and in dyspepsia.
27	<i>Arundo donax</i> L.	Giant-Reed	Poaceae	Native	Leaves and stem	Used for skin treatment.
28	<i>Polypogon fugax</i> Nees ex Steud.	Asia Minor blue grass	Poaceae	Native	Leaves	Used as anti-allergic on infected skin
29	<i>Persicaria glabra</i> (Willd.) M. Gómez	Dense knotweed	Polygonaceae	Native	Leaves	Used as anti-inflammatory and to reduce stomach pain.
30	<i>Eichhornia crassipes</i> (Mart) solms	Water hyacinth	Pontederiaceae	Alien	Flower	Used for treatment of goiter and skin problems of horses.
31	<i>Monochoria hastata</i> (L.) Solms.	Arrow pond weed	Pontederiaceae	Alien	Leaves and crushed rhizome	Used for the treatment of toothache, asthma, cough cold fever, liver-disorders, hepatitis, hemorrhage, anemia, scurvy and diabetes.
32	<i>Monochoria vaginalis</i> (Burm. f.)	Pickerel weed	Pontederiaceae	Native	Leaves and young shoot	Used for the treatment of scurvy and digestive disorders.
33	<i>Portulaca oleracea</i> L.	Common purslane	Portulacaceae	Alien	seeds	Used for the treatment uterine, antidiabetic and gastric problems.
34	<i>Stuckenia pectinata</i> L. Börner	Fennel-leaved pond weed	Potamogetonaceae	Alien	Whole plant	Used for the treatment of liver inflammation.
35	<i>Potamogeton crispus</i> L.	Curlyleaf pond weed	Potamogetonaceae	Native	Whole plant	Used as diuretic and treatment of urinary tract infection
36	<i>Potamogeton natans</i> L.	Floating pond weed	Potamogetonaceae	Alien	Whole plant	Used as febrifuge
37	<i>Ranunculus sceleratus</i> L.	Cursed buttercup	Ranunculaceae	Native	Whole plant	Used to cure boils and to remove skin scarring and decrease hypersensitivity of penis.
38	<i>Nicotiana glumaginifolia</i> Viv.	Tex-Mex tobacco	Solanaceae	Alien	Leaves	Applied on cuts, wounds and used for the treatment of toothache, rheumatic swelling.
39	<i>Veronica-anagallis aquatic</i> L.	Blue water speed wall	Scrophluriaceae	Alien	Leaves	Used as astringent and antispasmodic
40	<i>Trapa natans</i> L.	Sangara	Trapaceae	Native	Fresh fruit	Applied as ant-inflammatory, antidiuretic and to stop the thick yellowish discharge from genital organs of both male and female. Maintains male sexuality, prevents dryness of throat and improves blood circulation.
41	<i>Typha latifolia</i> L.	Broad leaf cattail	Typhaceae	Native	Root	Used to clot blood and as demulcent during fever. Aromatic compound Tonic for brain and heart. Antidiuretic especially in children.
42	<i>Phyla nodiflora</i> (Linn.)	Greene frog fruit	Verbenaceae	Alien	Whole plant	Applied for the treatment of gonorrhoea, urinary bladder, kidney stone, piles blood purifier and diuretic.

4. Discussion

The present research was conducted to document the traditional knowledge on medicinally important plants in different wetlands of tehsil Shakargarh, district Narowal, Punjab Pakistan. Hydrophytes species have great economic and environmental uses, e.g. *Hydrilla verticillata* is used as food for fish in Lake Phewa and Lake Rupa (Nepal) and in

some other countries [10]. Similarly, young shoot of *Nasturtium officinale* and tuber of *Eleocharis* are used in human diet as vegetable [10, 11]. The seed, rhizome and petiole of *Nelumbo nucifera* and fruits of *Trapa natans* have commercial utilization by local inhabitants in India [12]. Leaf decoction of *Hydrilla verticillata* (L.F.) Royle is used in the treatment of boils, wounds and dried leaf powder for

accelerating healing processes^[13]. Similarly leaves of *Lemna minor* L. and *Persicaria glabra* (Wild.) M. Gómez is used to cure skin, urination problems and to reduce the colic pain, respectively^[14]. The leaves of *Pistia stratiotes* L. are used for the treatment of ulcers, leprosy, eczema, syphilis, piles and chronic skin diseases^[13]. The powder roots of *Pistia stratiotes* L. is used as laxative^[13]. Application of paste from boiled leaves of water chestnut against scabies by the locals particularly the Jalharis needs phytochemical screening and verification^[10]. The local herbalists purchase the seeds of *Nelumbo nucifera*, as a cure for Jaundice at the rate of NRs. 50.00 (less than 1 US\$), per kg, indicating its high medicinal value in India^[12]. Similarly, *Ceratophyllum demersum* L. is used as cardio tonic and *Eichhornia crassipes* a good source of antioxidant agents^[15]. *Alternanthera sessilis* has been used in Indian traditional system of medicine since a long time against vitiated blood, skin diseases and ulcers^[16]. According to Badshah^[17] *Nasturtium officinale* and *Mentha spicata* have great medicinal importance. Ikram^[18] reported that leaves of *Nasturtium officinale*, *Mentha spicata* and *Eclipta alba* are used for wound healing, allergic problems, injury and digestive problems. *Alternanthera sessilis* and *Polygonum persicaria* are useful for cough healing, as astringents, diuretic, carminative and anti-inflammatory^[19]. Local inhabitants have been using hydrophytes like *Mentha spicata* and *Veronica anagallis* for the treatment of common diseases like hypoglycaemic, relieves flatulence, antispasmodic, vermifuge and diuretic^[19]. According to the local experts, three to four applications of this paste of leaves of *Eclipta alba* L. in between the fingers of feet are effective to completely cure the Athlete's foot disease, indicating the herb's effective antifungal activity that needs further exploration^[20]. Extract of whole plant, *Centaurium pulchellum* Swartz is used as a remedy for skin problems^[20]. Similarly leaves decoction of *Phylla nodiflora* (L.) Greene, is effective in treatment of urinary bladder problems^[20]. As herbal medicines are known to have no side effects, their importance cannot be ignored^[21]. Frequent and over exploitation of species may lead a threat to their survival in near future as was observed for some species in north eastern States^[22]. The major threats on wetland areas were fishing, edible insect collection and the conversion of marginal land of wetlands to paddy cultivation^[23]. The species that were imperilled due to diverse threats comprised *Laminae*, *Nelumbo nucifera*. Eating carpels of *Nelumbo nucifera* has aggravated its threatened status in Lake Rupa^[24] and in India^[25]. *Polygonum* spp, *Monochoria* spp, *Typha latifolia*, *Cyperus* spp. and *Trapa natans* also require due attention for conservation. Owing to lack of the basic health care facilities, the people mostly depend on these medicinal plants for the treatment of various diseases and disorders. It was observed that the old people are more liable to use ethno medicinal plants as primary health care, contrary to the young ones who prefer to use the modern medicine even in trivial ailments easily curable with medicinal herbs. Hopefully, this work may help to add information to the documentation of Red Data Book of Pakistan. For this reason, there is a dire need to conserve these resources that contribute to our own survival.

5. Conclusion

Ethnomedicinal studies on hydrophytes have been rarely conducted in the study area, therefore, it is important to prepare a documented data bank of the aquatic plants and the traditional herbal knowledge before any one of them is lost forever unnoticed. It is also a matter of concern that owing to

rapid urbanization, the water bodies of this part of Punjab are in peril and the aquatic plant diversity is being harmed. These natural resources are to be conserved for the benefit of the human beings for sustainable development of our country.

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