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**HERBAL REMEDIES OF AQUATIC MACROPHYTES OF  
GORAKHPUR DISTRICT, UTTAR PRADESH (INDIA)**

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**ABSTRACT**

Uttar Pradesh is situated in north central part of India and district Gorakhpur is situated in the Northern Terai Region of U.P. (India) below the lofty Himalayan Mountain. The climate and water bodies of this region provide best habitat for the luxuriant growth of aquatic macrophytes. Aquatic plants are miraculous green plants having multifarious potential for food, fodder, medicine and various ailments and diseases. Aquatic plants are used by people since ancient times as source of their day to day requirements due to the presence of different nutrient and chemical constituents. Therefore attempt has been made to document some of the known medicinal properties of aquatic plants which are used to cure various diseases.

**KEYWORDS:** Aquatic and semi-aquatic plants, Medicinal use, Biodiversity.



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## INTRODUCTION

Uttar Pradesh is situated in the north central part of India with varied topography and climatic regimes which sustains diverse and unique wetland habitats with rich floral and faunal diversity and district Gorakhpur is situated in the Northern Terai Region of U.P. (India). Gorakhpur city lies at 26° 46' N latitude and 83° 22' E longitude. The district is bounded by districts Mahrajganj in the north, Ambedkar Nagar, Azamgarh and Mau in the south, Kushinagar and Deoria in the east and Sant Kabir Nagar in the west. The Geographic area of Gorakhpur is 3321 (sq. km) and the Wetland Area is 27916 (ha). Apart from, Rivers/Streams, the major wetland types of the district are Lakes/Ponds and Ox-bow lakes/cut off meanders<sup>1</sup>. The climate and various water bodies of this region like Tal, various small water bodies, ponds, water reservoirs, marshes, swamps and water logging areas etc. exhibit enormous diversity according to their genesis, geographical location, water regime and chemistry, dominant plants and soil or sediment characteristics. Utility wise, wetlands directly and indirectly support millions of people in providing services such as food, fiber and raw materials, storm and flood control, clean water supply, scenic beauty and educational and recreational benefits. Some of the notable contributions on ethno medicinal properties of plant were done by many authors<sup>2-22</sup>. But

whole account of medicinal property of this major wetland of Gorakhpur district (U.P.) has been neglected. Therefore, the attempt has been made to document some of the little known medicinal properties of aquatic and wetland macrophytes of Gorakhpur district used by the local community.

## MATERIALS AND METHODS

A study in the Aquatic and Wetland Macrophytes of Gorakhpur district was carried out, during the year 2010-2012. During the survey, plants occurring in different regions are collected, photographed and identified and also the general remarks like nature of growth, habit, habitat, month of collection, medicinal property were noted through interviews and discussions among the local people in and around the study area. Data were also collected through questionnaires in their local language. The identification was made with the help of expert (expert from Department of Botany, DDU Gorakhpur University, Gorakhpur), standard floras and literature<sup>23-25</sup>. The collected plant specimens are preserved by herbarium technique. The plants are listed alphabetically with Botanical name with family. The plants with their name, family, month of collection, parts used, Medicinal uses, are also mentioned in table: 1.

**Table 1**  
**Classification and their medicinal value**

S.No	Name of Plant	Family	Month of Collection	Part Used	Medicinal Uses
1	<i>Achyranthes aspera</i> Linn.	Amaranthaceae	Oct-Mar	Whole plant	Abortion, inducing labor pains, stopping excessive bleeding, dysmenorrhea, amenorrhea.
2	<i>Aeschynomene indica</i> Linn.	Papilionaceae	Jul-Oct	Seeds	Body pain and swellings.
3	<i>Ageratum conyzoides</i> Linn.	Asteraceae	Dec-Jun	Leaves, roots	Bactericide, antidiarrhetic, and antilithic.
4	<i>Alternanthera pungens</i> Kunth	Amaranthaceae	Jul-Jan	Leaves	Diuretic properties, decoction to treat gonorrhoea.
5	<i>Alternanthera sessilis</i> (Linn.)	Amaranthaceae	Aug-Oct	Leaves, young shoot	Anti-inflammatory and antipyretic activity, night blindness.
6	<i>Amaranthus spinosus</i> Linn.	Amaranthaceae	Nov-Mar	Leaves, roots	Root laxative, as emollient poultice, whole plant used for treatment for body pain.
7	<i>Amaranthus viridis</i> Linn.	Amaranthaceae	Mar-Sep	Leaves	Leaf as emollient digestive, vermifuge, centipede and scorpion.

8	<i>Ammania baccifera</i> Linn.	Lythraceae	Aug-Jan	Leaves	Used to stimulate appetite, relieve the bowels of costiveness, promote digestion and stimulate venereal desire.
9	<i>Ammania multiflora</i> Roxb.	Lythraceae	Jul-Feb	Seeds	Used in stomach disorders.
10	<i>Anagallis arvensis</i> Linn.	Primulaceae	Nov-Mar	Whole plant	Wound healing, leprosy, toxic at high doses.
11	<i>Aponogeton natans</i> (Linn.)	Aponogetonaceae	Sep-Nov	Tubers	Tuberous rootstocks edible.
12	<i>Argemone maxicana</i> Linn.	Papaveraceae	Feb-Jun	Whole plant	Latex is useful in eye diseases, analgesic, roots are anthelmintic diuretic, purgative and destroy worms.
13	<i>Arundo donax</i> Linn.	Poaceae	Sep-Feb	Rhizome, shoot	Tender shoot paste is given to children to cure intestinal worms, typhoid, rhizome in diuretic and emollient.
14	<i>Bacopa monnieri</i> (Linn.)	Scrophulariaceae	Jul-Dec	Leaves, stem	In nerve tonic, epilepsy and asthma, ulcers, indigestion, anemia, gonorrhoeal troubles and biliousness.
15	<i>Brassica juncea</i> (Linn.)	Brassicaceae	Dec-March	Leaves	Leaf extract used to treat diabetic cataract.
16	<i>Bulbostylis barbata</i> (Rottb.)	Cyperaceae	Jul-Dec	Roots	The decoction of the plant in dysentery.
17	<i>Caesulia axillaris</i> Roxb.	Asteraceae	Sep-Jan	Leaves, root	Leaves applied to wounds act as a styptic and heal them quickly. The juice of the root is said to possess antilithic properties.
18	<i>Centella asiatica</i> (Linn)	Apiaceae	Jun-Jan	Whole plant,	As a cerebral tonic, a circulatory stimulant and a diuretic, in leprosy, dysentery, blood purifier.
19	<i>Centipeda minima</i> (Linn.)	Asteraceae	Dec-Mar	Leaves, seeds	Induces sneezing, vermifuge.
20	<i>Ceratophyllum demersum</i> Linn.	Ceratophyllaceae	Sep-Nov	Leaves, shoot	As cooling agent, in fish culture.
21	<i>Chenopodium album</i> Linn	Chenopodiaceae	Feb-Jun	Aerial part	In diseases of blood, heart, spleen, eye and in biliousness conditions, cough, abdominal pain.
22	<i>Chenopodium ambrosioides</i> Linn.	Chenopodiaceae	Mar-Oct	Whole plant	Swellings, oedema, gout, pain-killers, skin, mucosae, laxatives.
23	<i>Coix lachryma-jobi</i> Linn.	Poaceae	Sep-Feb	Roots	Sedative, analgesic and antipyretic.
24	<i>Colocasia esculenta</i> (Linn.)	Araceae	Sep-Nov	Leaves, rhizome	Leaf juice as a good oxygenator, in swelling and pain and fever.
25	<i>Commelina benghalensis</i> Linn	Commelinaceae	Jul-Nov	Leaves, shoot	Diuretic, cure swellings of the skin, leprosy and as a laxative
26	<i>Corchorous aestuans</i> Linn.	Tiliaceae	Aug-Oct	Seeds, aerial parts	Stomachic, anti-inflammatory, used in pneumonia.
27	<i>Corchorous capsularis</i> Linn.	Tiliaceae	Aug-Oct	whole plant	In dysentery and as a tonic.
28	<i>Cynodon dactylon</i> (Linn.)	Poaceae	Jul-Oct	Whole plant	Whole plant paste used to cure cuts and wounds, in nasal bleeding.
29	<i>Cyperus alopecuroides</i> Rottb.	Cyperaceae	Aug-Nov	Leaves, shoot	Astringent, digestive tonic, anti-inflammatory, antispasmodic, diuretic and to promote menstruation.
30	<i>Cyperus brevifolius</i> (Rottb.)	Cyperaceae	Jun-Oct	Whole plant	Whooping cough, bronchitis, swelling pain in the throat, malaria, dysentery.
31	<i>Cyperus difformis</i> Linn.	Cyperaceae	Aug-Jan	leaves, tubers	In diarrhea.
32	<i>Cyperus exaltsatus</i>	Cyperaceae	Sep-Dec	Tubers	In abdominal diseases.

	Retz.					
33	<i>Cyperus iria</i> Linn.	Cyperaceae	Aug-Nov	Aerial tuber	part,	Used as tonic, stimulant and stomachic, astringent.
34	<i>Cyperus rotundus</i> Linn.	Cyperaceae	Jul-Dec	Tubers		Fevers, digestive system disorders, wounds.
35	<i>Cyperus triceps</i> (Rottb.)	Cyperaceae	Jul-Nov	Tubers		Used for treating diabetes and fever, in liver complaints.
36	<i>Dactyloctenium aegyptium</i> (Linn.)	Poaceae	Aug-Nov	Whole plant, seeds		Plant juice used for fevers, used externally for wounds and ulcers dysentery and acute hemoptysis.
37	<i>Dentella repens</i> (Linn.)	Rubiaceae	Jul-Feb	Leaves, Roots		For poulticing sores, loose motion in infants, blood pressure.
38	<i>Desmostachya bipinnata</i> (Linn.)	Poaceae	Jun-Nov	Leaves		To treat dysentery and menorrhagia and as a diuretic.
39	<i>Echinochloa colonum</i> (Linn.)	Poaceae	Jun-Dec	Leaves, Seeds		Used as fodder.
40	<i>Echinochloa crus-galli</i> (Linn.)	Poaceae	Jul-Nov	Leaves, grains		To be preventative and tonic, in sores, spleen trouble, cancer and wounds.
41	<i>Eichornia crassipes</i> (Mart.)	Pontederiaceae	May-Oct	Flowers		In skin diseases of horse.
42	<i>Eclipta prostrata</i> (Linn.)	Asteraceae	Jul-Apr	whole plant		Hepatic diseases and hyperlipidemia, hepatic diseases and hyperlipidemia.
43	<i>Eleocharis dulcis</i> (Burm.f.)	Cyperaceae	Sep-Jan	Tubers		Abdominal pain, hernia and liver problems, the expressed juice of the tuber is bactericidal.
44	<i>Eleusine indica</i> (Linn.)	Poaceae	Jul-Dec	Leaves		Diuretic, antihelminthic, for dysentery.
45	<i>Enhydra fluctuans</i> Lour.	Asteraceae	Oct-Mar	Whole plant		Skin diseases, dysentery, liver diseases, eyesight improvement.
46	<i>Euryale ferox</i> Salisb.	Nymphaeaceae	May-Jul	Leaves, Seeds, flowers		In kidney and gall bladder stone dissolution, seed in cough, asthma, flower in tonic.
47	<i>Fimbristylis miliacea</i> (Linn.)	Cyperaceae	Oct-Dec	Leaves, roots		Leaves for poulticing in fever, roots for dysentery.
48	<i>Fimbristylis ovata</i> (Burm. f.)	Cyperaceae	Aug-Dec	Tuber, culm		Arthritis, rheumatism, stomachaches.
49	<i>Grangea maderaspatana</i> (Linn.)	Asteraceae	Dec-Jun	Leaves		Ear treatments, generally healing, pain-killers, sedatives, stomach troubles.
50	<i>Hydrilla verticillata</i> (Linn. f.)	Hydrocharitaceae	Jul-Dec	Whole plant		In boils, wounds, on cut.
51	<i>Hydrolea zeylanica</i> (Linn.)	Hydrophyllaceae	Sep-Nov	Leaves		Leaves pulp, used as poultice to facilitate healing of neglected and callous ulcers.
52	<i>Hygrophila auriculata</i> (Schumach.)	Acanthaceae	Sep-Dec	Leaves, roots, seeds		Arthritis, rheumatism, jaundice, seed have aromatic substances.
53	<i>Hygroryza aristata</i> (Retz.)	Poaceae	Oct-Dec	Seeds		Seeds are cooling and astringent to urinary tract, useful in biliousness.
54	<i>Imperata cylindrica</i> (Linn.)	Poaceae	Aug-Nov	Roots, spikes		Roots, used for dysentery, spikes used as vulnerary.
55	<i>Ipomoea aquatica</i> Forsk.	Convolvulaceae	Jul-Nov	Leaves, young shoots, fruits		Used as antidote to opium in kidney disorder, gastric and intestinal disorder
56	<i>Ipomoea fistulosa</i> Mart.	Convolvulaceae	Aug-May	Leaves		Used on boils.
57	<i>Lemna perpusilla</i> Torrey	Lemnaceae	Oct-Dec	fronds		Used as food by fish and duck.
58	<i>Limnophila indica</i> (Linn.)	Scrophulariaceae	Sep-Feb	Leaves		Antiseptic, diarrhoea, dysentery, swellings, gout,

						stomach troubles.
59	<i>Lindernia ciliata</i> (Colsm.)	Scrophulariaceae	Jul-Dec	Leaves		Used in gonorrhoea.
60	<i>Ludwigia adscendens</i> (Linn.)	Onagraceae	Sep-Jan	Leaves, roots		Dysentery, antimicrobial activity, roots in fever and stomach disorders.
61	<i>Ludwigia octovalvis</i> (Jacq.)	Onagraceae	Oct-Jan	Whole plant		In fever and body ache.
62	<i>Melochia corchorifolia</i> Linn.	Sterculiaceae	Aug-Nov	Leaves,		Reduce ulcers, abdominal swelling, and headache and chest pain.
63	<i>Monochoria hastata</i> (Linn.)	Pontederiaceae	Jul-Nov	Leaves, root		Cough, to strengthen uterine tone.
64	<i>Najas graminea</i> Del.	Najadaceae	Sep-Dec	Leaves,		Leaf paste used on boils and goiter.
65	<i>Nelumbo nucifera</i> Gaertn.	Nelumbonaceae	Jun-Aug	whole plant		Heart tonic, skin diseases, coolant, diarrhea, piles and stomach ulcer.
66	<i>Nymphaea nauchali</i> Burm. f.	Nymphaeaceae	Aug-Nov	whole plant		In restlessness, intestinal disorder, jaundice, piles, root in diarrhea, dysentery, petals in eye diseases.
67	<i>Nymphaea stelata</i> Willd.	Nymphaeaceae	Oct-Dec	Rhizomes, flowers, seeds		Used for diabetes, liver disorders, urinary problems, menorrhagia, blenorragia, also used as tonic and aphrodisiac.
68	<i>Nymphoides indicum</i> (Linn.)	Gentianaceae	Apr-Dec	Leaves, petiole		Leaves, petiole used in stomach tonic and in stomach disorder.
69	<i>Ottelia alismoides</i> (Linn.)	Hydrocharitaceae	Sep-Dec	Flower		Flower used as tonic for children.
70	<i>Oxalis corniculata</i> Linn.	Oxalidaceae	Nov-Jun	whole plant		Used diarrhea, hemorrhoids, dysentery, hepatitis, dysmenorrhoea, amenorrhoea, dysmenorrhoea and dyspepsia.
71	<i>Paspalum scrobiculatum</i> Linn.	Poaceae	Aug-Dec	rhizomes, stems, roots, grains		Used in decoction as an alternative in child birth, stem Juice used for corneal opacities, grains for diabetes.
72	<i>Pentapetes phoenicea</i> Linn.	Sterculiaceae	Aug-Nov	Root		Root decoction use twice daily for burning micturition, astringent, antibilious.
73	<i>Phalaris minor</i> Retz.	Poaceae	Nov-May	Aerial part		Used as fodder.
74	<i>Phragmites maxima</i> (Forsk.)	Poaceae	Sep-Dec	Leaves, Stems, rhizome,		Stem and rhizome diuretic, diaphoretic, leaves in Paralysis.
75	<i>Phyla nodiflora</i> (Linn.)	Verbenaceae	Leaves	Leaves		Used as demulcent in gonorrhoea, leaves paste applied to swellings and wounds.
76	<i>Pistia stratiotes</i> Linn.	Araceae	Aug-Nov	Leaves		Leaf paste applied on forehead as cure for headache.
77	<i>Polygonum barbatum</i> Linn.	Polygonaceae	Sep-Jan	Leaves, roots		Roots are used as astringent and as a cooling agent, leaves used in treatment of Piles.
78	<i>Polygonum glabrum</i> Willd.	Polygonaceae	Sep-Apr	Leaves, roots		Used in the cure of animal dysentery.
79	<i>Polygonum hydropiper</i> Linn.	Polygonaceae	Sep-Jan	Leaves		Used in cure of wounds.
80	<i>Polygonum plebium</i> R.Br.	Polygonaceae	Aug-Apr	Whole plant		Powdered plant is taken internally in pneumonia.
81	<i>Potentilla supina</i> Linn.	Rosaceae	Jan-Apr	Roots		Astringent, febrifuge and tonic, toothache, indigestion.
82	<i>Ranunculus Sceleratus</i> Linn	Ranunculaceae	Feb-May	Leaves		Used in stomach ache and arthritis.
83	<i>Rotala indica</i> (Willd.)	Lythraceae	Sep-Jan	Leaves		Leaf paste applied on forehead to relief from migraine.
84	<i>Rotala rotundifolia</i> (Buch.-Ham.)	Lythraceae	Jan-May	Whole plant		Plant powder used externally to cure eczema.

85	<i>Rumex dentatus</i> Linn.	Polygonaceae	Jan-Jun	Roots	Used as astringent and in cutaneous disorder.
86	<i>Saccharum spontaneum</i> Linn.	Poaceae	Sep-Jan	Roots	Roots are sweet, astringent, refrigerant, tonic and useful in treatment of dyspepsia, burning sensation, piles.
87	<i>Sagittaria sagittifolia</i> Linn.	Alismataceae	Oct-Mar	Roots	Used in treatment of leucorrhoea.
88	<i>Scirpus articulatus</i> Linn.	Cyperaceae	Sep-Dec	Whole plant.	Plant is used as a purgative, for vomiting.
89	<i>Scirpus mucronatus</i> Linn.	Cyperaceae	Oct-Mar	Aerial part	Used as fodder.
90	<i>Sphaeranthus indicus</i> Linn.	Asteraceae	Oct-Feb	Whole plant	Used as blood purifier in cough, diabetes, leprosy, fever, skin diseases, roots used as nerve tonic.
91	<i>Sphenoclea zeylanica</i> Gaertn.	Sphenocleaceae	Aug-Feb	Leaves	Used to cure the ulcers.
92	<i>Trapa natans</i> Linn.	Trapaceae	Sep-Dec	Seeds	In diarrhea, gonorrhoea, stomachic and cooling.
93	<i>Vallisneria spiralis</i> Linn.	Hydrocharitaceae	Jan-Apr	Leaves	Refrigerant, leucorrhoea, stomachic and is also used in the treatment of women's complaints.
94	<i>Verbascum chinense</i> (Linn.)	Scrophulariaceae	Feb-May	Leaves	Leaf juice is used in diarrhea and dysentery.
95	<i>Veronica anagallis-aquatica</i> Linn.	Scrophulariaceae	Nov-Apr	Whole plant	In stomach disorders, leaves on wounds, in scurvy, impurity of the blood, root and the leaves are alterative, appetizer and diuretic.
96	<i>Vetiveria zizanioides</i> (Linn.)	Poaceae	Aug-Jan	Whole plant	Decoction used for the treatment of all kinds of poison in toxicology.
97	<i>Xanthium strumarium</i> Linn.	Asteraceae	Sep-Jun	Roots, fruits,	Roots are bitter and tonic used in strumous diseases and cancer, fruits given in small pox.

## RESULTS

The taxonomic investigation on the aquatic and wetland macrophytes in district Gorakhpur was carried out. During the study a total of 97 plant species under 75 genera belonging to 39 families were collected and identified which possess some medicinal potential. Among 97 species 57 species belong to dicotyledons and 40 species to monocotyledons. The some most important medicinal plants are *Bacopa monnieri*, *Centella asiatica*, *Chenopodium album*, *Eclipta prostrata*, *Hygrophila auriculata*, *Polygonum hydropiper*, *Ranunculus Scleratus*, and *Veronica anagallis-aquatica*, are used throughout by common people. Leaf of *Alternanthera sessilis*,

*Amaranthus spinosus*, *Amaranthus viridis*, *Chenopodium album*, *Colocasia esculenta*, *Ipomoea aquatica*; seeds of *Euryale ferox*, *Echinochloa crus-gali*, *Hygrophiza aristata*, *Nelumbo nucifera*, *Trapa natans*; tuber of *Colocasia esculenta*, *Nymphaea nauchali*, *Sagittaria sagitifolia* are used as food and medicine by the people due to their high potential. *Ceratophyllum demersum*, *Enhydra fluctuans*, *Ludwigia adscendens*, *Monochoria hastata*, *Ranunculus Scleratus*, *Veronica anagallis-aquatica*, are used as fodder. In present investigation the maximum number of plants is of Poaceae family over the Cyperaceae and Asteraceae.

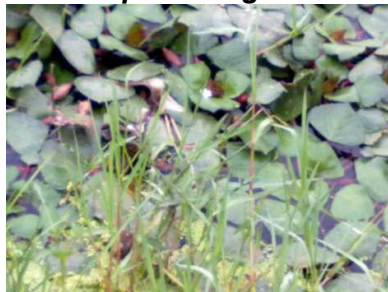
**Photograph**  
**Aquatic medicinal plants**



**Aquatic vegetation**



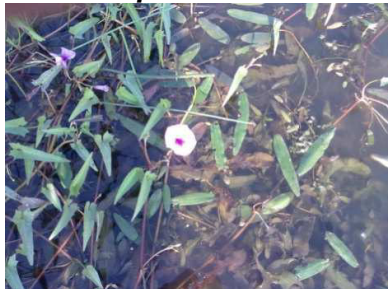
**Colocasia esculenta**



**Trapa natans**



**Tuber of Sagittaria sagittifolia**



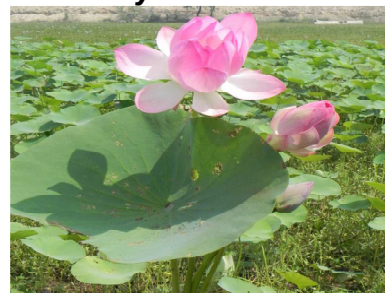
**Ipomoea aquatic**



**Enhydra fluctuans**



**Euryale ferox**



**Nelumbo nucifera**

**DISCUSSION**

Since ancient times traditional use of plants by human being for various purposes found in ancient literature. The World Health Organization estimates that 80% of the people in developing world still rely on traditional medicine. India is endowed with an estimated 47,000 species of plants. Of these around 8000 plants which are known to have medicinal properties. Mostly the local people

inhabited around the wetland areas use aquatic plants for food, medicine, fodder, socio-cultural, spiritual and for other their day to day requirements but the people of urban areas are lack of this knowledge due to maximum use of allopath. There are many diseases which are curable by our traditional knowledge in spite of modern medicine. It is still a living tradition to use the plants for many



purposes. Aquatic plants are the best source of medicine due to having various chemical constituents; this provides a new area of research for further ethano-pharmacological investigations on them. But due to rapidly shrinking of wetland areas due to urbanization and for agricultural, the flora and fauna of that wetland areas are depleting. So we have to pay immediate attention on protection and prevention method of that ethanobotanically

useful plants of Gorakhpur district for the benefits of plants, animals and as well as of humanbeings.

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