

Environment Education for Ecosystem Conservation

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Wetland Flora of Uttara Kannada

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INTRODUCTION

Uttara Kannada district enjoys a tropical climate with heavy monsoon showers. Hence, during rainy seasons most places such as grasslands, fields, wastelands, etc. are inundated by water. Many ditches and small puddles are created which hold water for several months due to continuous rain. Both permanent waterbodies such as lakes, rivers and large ponds, etc., and temporary waterbodies such as laterite bogs, puddles, etc., harbour large number of plants, which require 'wet habitats' for a period. Hence, we have accounted the plants growing in all water inundated places, either temporary or permanent, and also wet soils which are not water logged. Plants confined to marine and highly brackish waters are excluded.

Life Forms

Plants growing in wetlands and other moist soils may either be annuals or perennials. Many of the smaller and slender herbs are annuals. They flower, fruit, disperse seeds and die in a single year. However, perennials sustain for many years developing food-storing woody structures such as rhizomes, corms, stolons, etc.

Growth Forms

There have been many attempts to classify aquatic plants according to their growth forms. Cook (1996) summarised them and suggested a classification based on the response of the plant to milieu for growth and development rather than directly on its morphology or the way it survives adverse conditions (Cook, C.D.K., 1996). According to this, the different types of growth forms are:

- Ephydates : Bottom-rooted with floating leaves.
- Haptophyte : Attached to but not penetrating the substrate.
- Hyperhydate : Emergent aquatics (lower parts almost always in water)
- Plankton : Free swimming below the water surface.
- Pleustophyte : Free-floating (at the water surface)
- Rosulate : Submerged, bottom rooted, leaves in a rosette.
- Tenagophyte : Juvenile submerged, adult usually terrestrial.
- Vittate : Submerged, bottom rooted, leaves cauline

However, many species change their dependence on water in regions with differing climates or with different hydrological regimes. Such plants can have more than one life form.

STUDY AREA

The Uttara Kannada district lies from 74° 9' to 75° 10' east longitude and 13° 55' to 15° 31' north latitude. The district has three main and distinctive regions: the coastlands, the Sahyadrian, and eastern margin where the tableland begins. The relief and climate have introduced these regional differences. The four leading rivers, the Kalinadi in the north, the Bedthi or Gangavali about 32 km south, the Aghanashini or Tadri and the Sharavathi about 24 km south of the Tadri, and the smaller Venkatapura river and few rivulets like the Varada, Belekeri, Ankola, Gorgadde halla and the Bhatkal or Sharabi create many wetland habitats both temporary and permanent. Apart from these wetland systems, large number of other wetlands such as lakes, reservoirs, ponds, puddles, lateritic bogs, wet grasslands, marshes, swamps dot the district, harbouring a large number of wetland plants.

MATERIALS AND METHODS

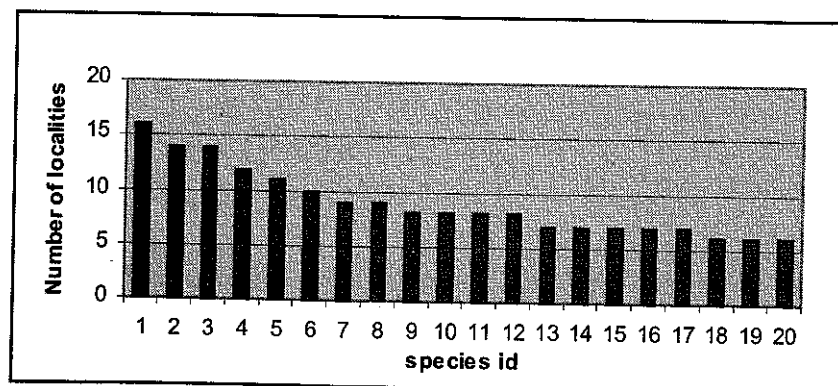
The survey was a random opportunistic survey visiting 29 different wetland localities in nine taluks of Uttara Kannada district (see Table 1 for locality id). Some of the plain area taluks are not studied here. In each wetland, plants were collected from different wetland zones such as deep waters, shallow water, fringes, and other nearby moist soils around the wetland. Rare and unidentified specimens were pressed for herbaria using dry method. Photographs and geographical co-ordinates of occurrence using global positioning system (GPS) were noted. Fresh specimens were identified with the comparison from regional and other floras.

RESULTS AND DISCUSSION

A total of 167 species from 32 families were identified from the 29 localities distributed in nine taluks. *Schoenoplectus lateriflorus* was the most widely occurring species in a total of 16 localities followed by *Cyperus halpan* and *Geissaspis cristata*. *Cyperus halpan* has two sub species *C. halpan* subsp. *halpan* and *C. halpan* subsp. *juncoides* L. (Fig 1). Species of *Schoenoplectus*

Table 1 Wetland study localities in Uttara Kannada

Locality ID	Locality
1	Ragihosahalli (Sirsi)
2	Shirali (Bhatkal)
3	Badagani-Haldipur (Honnavar)
4	Muguli (Honnavar)
5	Hosur (Kumta)
6	Karki (Honnavar)
7	Kathlekan swamps (Siddapur)
8	Gunavanti-nelikere (Honnavar)
9	Holegadde (Kumta)
10	Amdalli (Ankola)
11	Sailwada (Karwar)
12	Bramur-Nagur cross (Mirjan)
13	Kalve-Santeguli (Kumta)
14	Alvekodi (Kumta)
15	Chandrani-Haldipur (Honnavar)
16	Chittakula (Karwar)
17	Doodlimala (Joida)
18	Hankon (Karwar)
19	Prabathnagar (Honnavar)
20	Jalavalli-Karki (Honnavar)
21	Dabguli (Yellapur)
22	Diggie (Joida)
23	Apsarakonda (Honnavar)
24	Bazarkunang (Joida)
25	Heggerikere (bargi-kumta)
26	Kathlekan-Hejani (Siddapur)
27	Kasargod (Honnavar)
28	Maralli (Sirsi)
29	Waatehalla (Honnavar)

**Fig. 1** Widely occurring species (for species id see Table 2)

and *C. halpan* are found in shallow temporary waters, fringes of permanent waterbodies and in slow running streams. *G. cristata* occurred mostly in wet soils along the marshes, ponds and river banks and hence it is common in many localities. These were associated with species of *Lindernia*, *Fimbristylis*, *Eriocaulon*, etc. Deeper water was mostly harboured by species of *Nymphaea*, *Nymphoides* and other rooted floating species.

Table 2 Species name with species id

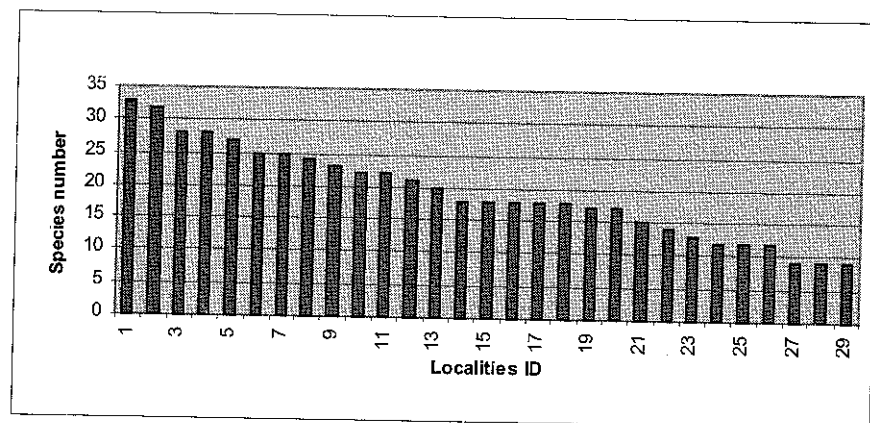
Species id	Species
1	<i>Schoenoplectus lateriflorus</i>
2	<i>Cyperus halpan</i>
3	<i>Geissaspis cristata</i>
4	<i>Lindernia crustacea</i>
5	<i>Fimbristylis tetragona</i>
6	<i>Fuirena ciliaris</i>
7	<i>Eriocaulon xeranthemum</i>
8	<i>Fimbristylis acuminata</i>
9	<i>Elaeocharis retroflexa</i>
10	<i>Fimbristylis littoralis</i>
11	<i>Lindernia pusilla</i>
12	<i>Lobelia alsinoides</i>
13	<i>Cyperus tenuispica</i>
14	<i>Eragrostis unioloides</i>
15	<i>Eriocaulon cinereum</i>
16	<i>Fimbristylis schoenoides</i>
17	<i>Limnophila repens</i>
18	<i>Blyxa aubertii</i>
19	<i>Hydrilla verticillata</i>
20	<i>Lindernia ciliata</i>

Cyperaceae had the highest number of species (50) while other species followed as shown in Table 3. This is also seen in the total species count of all species in a family in different localities. Here also Cyperaceae had a highest of 182 species count in different localities followed by other families. This shows the importance of Cyperaceae members in wetland ecosystems. Scrophulariaceae, Poaceae and Eriocaulaceae also have a higher species diversity and count. However, many of these species are not restricted only to wetlands, but also to nearby moist soils.

Ragihosahalli of Sirsi taluk had the highest number of species diversity with 33 species followed by Shirali of Bhatkal with 32, Haldipur of Honnavar and Hosur of Kumta with 28 species each (Fig 2). Except Ragihosahalli, most of the coastal taluks had large freshwater marshes; hence they showed high species diversity compared to higher altitude lands such as Waatehalla, Kathlekan, Yellapur, etc.

Table 3 Family-wise species count in different localities

No.	Family	Total no of species	Species count in different localities
1	Cyperaceae	50	182
2	Scrophulariaceae	23	65
3	Poaceae	26	63
4	Eriocaulaceae	14	50
5	Lythraceae	7	19
6	Fabaceae	5	18
7	Lentibulariaceae	4	16
8	Asteraceae	7	16
9	Onagraceae	6	14
10	Hydrocharitaceae	3	13
11	Rubiaceae	4	12
12	Nymphaeaceae	2	10
13	Commelinaceae	6	8
14	Araceae	3	8

**Fig. 2** Different localities ID and their species number
(For localities see Table 1)

Nearly 97 species are annuals showing the temporary nature of the wetlands. In some of the permanent wetlands 42 perennial species were seen (Table 4). Many fall in between these two categories (annual/perennial) and can be either of the two according to the wetland systems. Some of the annuals may also show tendencies towards perenniality if the wetland is permanent.

There are 17 endemic plants to India, of which many are endemic to the Western Ghats. Eriocaulaceae had the highest number of endemics

Table 4 Number of annuals or perennial species

1	Annuals	97
2	Perennials	42
3	Annuals/Perennials	25

(Table 5). *Weisneria triandra* is also an endangered species found mostly in lateritic bogs of coastal areas.

Table 5 Wetland plants endemic to Western Ghats and India

Sl.no.	Endemic species	Family
1	<i>Cryptocoryne spiralis</i>	Araceae
2	<i>Eriocaulon cuspidatum</i>	Eriocaulaceae
3	<i>Eriocaulon dalzelli</i>	Eriocaulaceae
4	<i>Eriocaulon eurypeplon</i>	Eriocaulaceae
5	<i>Eriocaulon fysonii</i>	Eriocaulaceae
6	<i>Eriocaulon heterolepis</i>	Eriocaulaceae
7	<i>Eriocaulon lanceolatum</i>	Eriocaulaceae
8	<i>Eriocaulon stellatum</i>	Eriocaulaceae
9	<i>Fimbristylis woodrowii</i>	Cyperaceae
10	<i>Fuirena uncinata</i>	Cyperaceae
11	<i>Ischemum molle</i>	Poaceae
12	<i>Lagenandra meeboldii</i>	Araceae
13	<i>Pogostemon erectum</i>	Lamiaceae
14	<i>Rotala macrandra</i>	Lythraceae
15	<i>Rotala malamphuzensis</i>	Lythraceae
16	<i>Utricularia reticulata</i>	Lentibulariaceae
17	<i>Weisneria triandra</i>	Alismataceae

Many of the species such as *Cyperus rotundus*, *Spilanthes paniculata*, *Ammannia baccifera*, etc., as shown in Table 6, have high medicinal value. They are regularly collected by the village medicine practitioners for local use.

Table 6 Wetland plants of medicinal value

Sl.no.	Wetland species	Family
1	<i>Hygrophila schulli</i>	Acanthaceae
2	<i>Alternanthera sessilis</i>	Amaranthaceae
3	<i>Centella asiatica</i>	Apiaceae
4	<i>Eclipta alba</i>	Asteraceae
5	<i>Epiltes divaricata</i>	Asteraceae
6	<i>Grangea maderaspatna</i>	Asteraceae
7	<i>Spilanthes paniculata</i>	Asteraceae
8	<i>Coldenia procumbens</i>	Boraginaceae

(contd.)

9	<i>Rotula aquatica</i>	Boraginaceae
10	<i>Amisophacelus axillaris</i>	Commelinaceae
11	<i>Commelina diffusa</i>	Commelinaceae
12	<i>Murdannia nudiflora</i>	Commelinaceae
13	<i>Cyperus iria</i>	Cyperaceae
14	<i>Cyperus rotundus ssp rotundus</i>	Cyperaceae
15	<i>Eleocharis dulcis</i>	Cyperaceae
16	<i>Kyllinga brevifolia</i>	Cyperaceae
17	<i>Schoenoplectus articulatus</i>	Cyperaceae
18	<i>Elaeocharis retroflexa</i>	Cyperaceae
19	<i>Drosera burmanni</i>	Droseraceae
20	<i>Hoppea fastigiata</i>	Loganiaceae
21	<i>Ammannia baccifera</i>	Lythraceae
22	<i>Rotala indica</i>	Lythraceae
23	<i>Rotala rotundifolia</i>	Lythraceae
24	<i>Nymphaea nouchali</i>	Nymphaeaceae
25	<i>Coix-lacryma Jobi</i>	Poaceae
26	<i>Lindernia crustacea</i>	Scrophulariaceae

Plants such as *Alternanthera sessilis*, tubers of *Colocasia esculenta*, *Eleocharis dulcis* are eaten as vegetables, *Cyperus iria*, *C pangorie*, *Fimbristylis dichotoma* are used in making mats (Table 7).

Table 7 Species with other uses

Sl.no.	Wetland species	Family
1	<i>Alternanthera sessilis</i>	Amaranthaceae
2	<i>Centella asiatica</i>	Apiaceae
3	<i>Cyperus iria</i>	Cyperaceae
4	<i>Cyperus rotundus ssp rotundus</i>	Cyperaceae
5	<i>Eleocharis dulcis</i>	Cyperaceae
6	<i>Colocasia esculenta</i>	Araceae
7	<i>Cyperus pangorie</i>	Cyperaceae
8	<i>Fimbristylis dichotoma</i>	Cyperaceae

CONCLUSION

Wetlands have a large diversity of plants needing wetness of varying degrees. These plants are accordingly adapted to the local availability of water and many show transition between annual and perennialness and also their type of growth forms. Large wetlands are found in the district catering for the needs of both plants and humans. With rapid urbanisation and other land use, wetlands are rapidly dwindling in number and size. Hence, wetlands such as lakes, streams, ponds (small or big), bogs, marshy grasslands, etc. have to be conserved and managed suitably for the welfare of both wetland plants and man.

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