

## PRELIMINARY FLORISTIC LIST OF CHOTIARI WETLAND COMPLEX, NAWAB SHAH, SINDH, PAKISTAN

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### Abstract

The goal of this study is to provide the existing botanical inventory of the area under study. A preliminary floristic survey was conducted in the month of September, 2006 for the record of plant biodiversity of Chotiari Wetland Complex. So far 120 plant species belonging to 84 genera and 39 families were identified. Of them, 22 grasses (Poaceae family) have been identified. Besides, one pteridophyte and one gymnospermic species were also discovered. The major plant families that contributed in the formation of vegetation in the area in question were Poaceae (18.33%), Fabaceae (8.33%), Capparidaceae and Solanaceae (5% each). The floristic checklist of species is provided in this paper.

### Introduction

Chotiari wetland complex lies in the province of Sindh, on western flanks of Anchor Thar desert (white sandy desert) at about 30 - 35 km northeast of Sanghar Town. The reservoir occupies an area of about 18,000 hectares and has water storage capacity of 0.75 million acre feet (MAF) flooding an area of approximately 160 km<sup>2</sup>. The climate of this area is of tropical to subtropical type. The hottest months are May and June when average maximum daily temperature exceeds 40°C. The coolest months are December to February, when the maximum daily temperatures range from 25 to 30°C. Rainfall is sparse and erratic and is most frequent between July and August when it averages 40 mm monthly.

There is meager information on the flora of this area. Therefore, present study was launched to botanize the study area. This is first report of the seasonal flora of the study area.

### Materials and Methods

An extensive survey was carried out during September, 2006 for the collection of plant specimens from the surveyed area. The collected specimens were identified with the help of various Floras (Jafri, 1966; Nasir & Ali 1970-1989; Ali & Nasir 1989-1993; Ali & Qaiser, 1993-1995, 2000-2006; Matthew, 1981-83; Batanouny, 1981; Boulos, 1991; Shetty & Singh, 1987 & 1991; Bhandari, 1987; Qureshi, 2004). Pteridophytes and gymnosperm species were identified following the work of Nakaïke & Malik (1992). The determined voucher specimens are deposited in the Department of Botany, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi. Life form classes were constructed by following the work of Raunkiaer (1934).

## Results

A preliminary floristic survey was conducted for the plant biodiversity of Chotiari Wetland Complex in the month of September, 2006. A total of 120 plant species belonging to 84 genera and 39 families were identified. Of them, 22 grasses (Poaceae family) have been identified. Besides, one pteridophyte and one gymnospermic species were also discovered. The major plant families that contributed in the formation of vegetation of the area in question were Poaceae (18.33%) followed by Fabaceae (8.33%), Capparidaceae and Solanaceae (5% each). The checklist of species along their family and life form/habit is provided in Table 1.

There was great diversity of life forms of the prevailing flora. The most frequent life form class was phanerophyte with the maximum number of species (37.50%). It was followed by Therophytes (33.33%), Hemicryptophytes (11.67%) and Chaemophytes (10.83%) (Fig. 1). Herbal coverage was the dominant in the flora of Chotiari reservoir with the 34.17% followed by shrubs (28.33%) and grasses (18.33%) (Fig. 2).

## Discussion

Chotiari wetland complex represents a wetland ecosystem that includes moist, swampy and shallow rooted vegetation and tropical scrubby vegetation on dunal area on the periphery. The common moisture loving plant species were *Typha elephantiana*, *T. domingensis*, *Phragmites karka*, *Sachharum* spp., *Cyperus* spp., *Persicaria glabra* and *Ipomoea aquatica*. Some of these species are used in cottage industry for mat making. In the lakes there is a thick population of submerged vegetation with floating leaves and are important in the nutrient cycling and respiratory gases. They often provide very dense habitats, which supply food and shelter to small organisms such as fingerlings and zooplankton. This sort of study has been carried out by Parveen & Hussain (2007) and results are in agreement with them.

*Nelumbium nucifera* and *Nymphaea lotus* were found in the shallow and deep water. Local inhabitants used them as their food source. The plants floating on the water surface include species like *Salvinia molesta*.

Islands are represented by xerophytic plants because of their topographical features. They are all of desertic nature with the sandy soil makeup. The dominant and frequent species like *Euphorbia caducifolia*, *Calligonum polygonoides*, *Aerva javanica*, *Salvadora oleoides*, *Indigofera* spp., *Aristida* spp., *Tribulus longipetalus* and *Limeum indicum* were forming common vegetation on them. There is no previous report available on the vegetation of islands of this area.

No endemic species has been found from the study area; however, *Lufa echinata* was recorded for the first time from this area. This species is regarded as a rare one that was recorded from Chitral, Swat and Tharparkar. However, it is abundantly found in this wetland on small islands.

## Conclusion

Chotiari reservoir is a unique landscape that contains water bodies and the desert ecosystem simultaneously. This merger of different ecosystem within the same area presents a wealth of flora and fauna. Although present study tried to record flora of different habitats yet it was a glimpse of the area. It is believed that there is ample opportunity that many plant species were left unrecorded hence need long-term comprehensive study to document both terrestrial and aquatic flora.

Table 1. Floristic list of plant species along with life form and habit recorded from Chotiari Wetland Complex.

Sr #	Family	Plant species	Life form	Habit
1.	Acanthaceae	<i>Blepharis indica</i> Stocks ex. T. Anders.	Therophyte	Shrub
2.	Aizoaceae	<i>Limeum indicum</i> Stocks ex. T. And.	Therophyte	Herb
3.	Aizoaceae	<i>Sesuvium sesuvioides</i> (Fens) Verdi.	Therophyte	Herb
4.	Aizoaceae	<i>Trianthema portulacastrum</i> L.	Therophyte	Herb
5.	Aizoaceae	<i>Zaleya pentandra</i> (L.) Jeffrey.	Chamaephyte	Herb
6.	Amaranthaceae	<i>Achyranthus aspera</i> L.	Phanerophyte	Robust herb
7.	Amaranthaceae	<i>Aerva javanica</i> (Burm.f.) Juss.	Phanerophyte	Robust herb
8.	Amaranthaceae	<i>Alternanthera sessilis</i> (L.) DC.	Chamaephyte	Herb
9.	Amaranthaceae	<i>Amaranthus graecizans</i> L.	Therophyte	Herb
10.	Amaranthaceae	<i>Digera muricata</i> (L.) Mart.	Therophyte	Herb
11.	Areaceae	<i>Phoenix sylvestris</i> Roxb.	Phanerophyte	Tree
12.	Asclepiadaceae	<i>Calotropis procera</i> (Ait.) Ait.f.	Phanerophyte	Tree
13.	Asclepiadaceae	<i>Leptadenia pyrotechnica</i> (Forsk.) Dene.	Phanerophyte	Shrub
14.	Asclepiadaceae	<i>Oxystelma esculentum</i> (L.f) R.Br.	Cryptophyte	Shrub
15.	Asclepiadaceae	<i>Pentstemon nivalis</i> (J.F.Gmel.) Field & J.R.I. Wood	Phanerophyte	Climber
16.	Asteraceae	<i>Eclipta prostrata</i> (L.) L.	Chamaephyte	Herb
17.	Asteraceae	<i>Pluchea lanceolata</i> (DC.) C.B. Clarke	Phanerophyte	Shrub
18.	Asteraceae	<i>Pluchea wallichiana</i> DC.	Phanerophyte	Shrub
19.	Boraginaceae	<i>Cordia dichotoma</i> Forster	Phanerophyte	Tree
20.	Boraginaceae	<i>Cordia gharaf</i> (Forsk.) Ehren. ex Asch.	Phanerophyte	Tree
21.	Boraginaceae	<i>Heliotropium crispum</i> Desf.	Phanerophyte	Shrub
22.	Brassicaceae	<i>Farselia hamiltonii</i> Royle	Therophyte	Herb
23.	Caesalpinaceae	<i>Senna italica</i> Mill.	Phanerophyte	Shrub
24.	Capparidaceae	<i>Capparis decidua</i> (Forsk.) Edgew.	Phanerophyte	Shrub
25.	Capparidaceae	<i>Cleome brachycarpa</i> Vahl ex DC.	Chamaephyte	Herb
26.	Capparidaceae	<i>Cleome scaposa</i> DC.	Therophyte	Herb
27.	Capparidaceae	<i>Cleome viscosa</i> L.	Therophyte	Herb
28.	Capparidaceae	<i>Dipterygium glaucum</i> Decne.	Phanerophyte	Sub-shrub
29.	Capparidaceae	<i>Gynandropsis gynandra</i> (L.) Briq.	Therophyte	Herb
30.	Chenopodiaceae	<i>Haloxylon salicornicum</i> (Moq.) Bunge ex Boiss.	Phanerophyte	Shrub

Table 1. (Cont'd.).

ir #	Family	Plant species	Life form	Habit
31.	Chenopodiaceae	<i>Salsola imbricata</i> Forsk.	Phanerophyte	Shrub
32.	Chenopodiaceae	<i>Suaeda fruticosa</i> Forsk. ex J.F.Gmelin	Phanerophyte	Shrub
33.	Convolvulaceae	<i>Convolvulus arvensis</i> L.	Therophyte	Climber
34.	Convolvulaceae	<i>Ipomoea aquatica</i> Forsk.	Hydrophyte	Herb
35.	Cucurbitaceae	<i>Citrullus colocynthis</i> (L.) Schrad.	Chamaephyte	Climber
36.	Cucurbitaceae	<i>Cucumis melo</i> var. <i>agrestis</i> Naud.	Cryptophyte	Climber
37.	Cucurbitaceae	<i>Luffa echinata</i> Roxb.	Phanerophyte	Climber
38.	Cucurbitaceae	<i>Mukia maderaspatana</i> (L.) M.J. Roem.	phanerophyte	Climber
39.	Cuscutaceae	<i>Cuscuta chinensis</i> Lam.	Cryptophyte	Parasite
40.	Cyperaceae	<i>Cyperus longus</i> L.	Hemicryptophyte	Sedge
41.	Cyperaceae	<i>Cyperus rotundus</i> L.	Hemicryptophyte	Sedge
42.	Ephedraceae	<i>Ephedra ciliata</i> Fisch. & Mey. Ex C.A.Meyer.	Gymnosperm	Shrub
43.	Euphorbiaceae	<i>Euphorbia caducifolia</i> Haines	Phanerophyte	Shrub
44.	Euphorbiaceae	<i>Euphorbia clarkeana</i> Hk.f.	Therophyte	Herb
45.	Euphorbiaceae	<i>Euphorbia serpens</i> Kunth	Therophyte	Herb
46.	Fabaceae	<i>Alhagi maurorum</i> Medic.	Phanerophyte	Subshrub
47.	Fabaceae	<i>Crotalaria burhia</i> Ham. Ex Bth.	Phanerophyte	Shrub
48.	Fabaceae	<i>Dalbergia sissoo</i> Roxb.	Phanerophyte	Tree
49.	Fabaceae	<i>Indigofera argentea</i> Burm.f.	Chamaephyte	Herb
50.	Fabaceae	<i>Indigofera cordifolia</i> Heyne ex Roth	Therophyte	Herb
51.	Fabaceae	<i>Indigofera hochstetteri</i> Baker	Therophyte	Herb
52.	Fabaceae	<i>Indigofera linifolia</i> (L.f.) Retz.	Therophyte	Herb
53.	Fabaceae	<i>Indigofera sessiliflora</i> DC.	Therophyte	Herb
54.	Fabaceae	<i>Tephrosia uniflora</i> Pers.	Phanerophyte	Shrub
55.	Fabaceae	<i>Tephrosia villosa</i> (L.) Pers.	Chamaephyte	Shrub
56.	Malvaceae	<i>Abutilon bidentatum</i> A. Rich.	Phanerophyte	Shrub
57.	Malvaceae	<i>Abutilon fruticosum</i> Guill.& Perr	Phanerophyte	Shrub
58.	Malvaceae	<i>Abutilon indicum</i> (L.) Sweet	Phanerophyte	Shrub
59.	Malvaceae	<i>Abutilon muticum</i> (Del.ex DC.) Sweet	Phanerophyte	Shrub
50.	Malvaceae	<i>Sida ovata</i> Forssk	Phanerophyte	Shrub

Table 1. (Cont'd.).

Sr #	Family	Plant species	Life form	Habit
61.	Marsiliaceae	<i>Marsilia minima</i> L.	Pteridophyte	Herb
62.	Menispermaceae	<i>Cocculus hirsutus</i> (L.) Diels	Phanerophyte	Vine
63.	Mimosaceae	<i>Acacia jacquemontii</i> Benth.	Phanerophyte	Shrub
64.	Mimosaceae	<i>Acacia nilotica</i> (L.) Del. subsp <i>indica</i> (Benth.) Branam	Phanerophyte	Tree
65.	Mimosaceae	<i>Acacia nilotica</i> subsp <i>cupressiformis</i> (T.L. Stewart) Ali	Phanerophyte	Tree
66.	Mimosaceae	<i>Prosopis cineraria</i> (L.) Druce.	Phanerophyte	Tree
67.	Mimosaceae	<i>Prosopis juliflora</i> Swartz	Phanerophyte	Shrub
68.	Molluginaceae	<i>Limeum indicum</i> Stocks ex. T. And.	Therophyte	Herb
69.	Neuradaceae	<i>Neurada procumbens</i> L.	Therophyte	Herb
70.	Nyctaginaceae	<i>Boerhavia diandra</i> L.	Therophyte	Herb
71.	Nyctaginaceae	<i>Boerhavia procumbens</i> Banks ex Roxb.	Cryptophyte	Herb
72.	Poaceae	<i>Aristida adscensionis</i> L.	Therophyte	Grass
73.	Poaceae	<i>Aristida funiculata</i> Trin. & Rupr.	Therophyte	Grass
74.	Poaceae	<i>Aristida mutabilis</i> Trin. & Rupr.	Therophyte	Grass
75.	Poaceae	<i>Bracharia ovalis</i> (R. Br.) Stapf	Hemicryptophyte	Grass
76.	Poaceae	<i>Bracharia ramosa</i> (L.) Stapf	Therophyte	Grass
77.	Poaceae	<i>Cenchrus biflorus</i> Roxb.	Therophyte	Grass
78.	Poaceae	<i>Cenchrus prieurii</i> (Kunth) A Maire	Hemicryptophyte	Grass
79.	Poaceae	<i>Cynodon dactylon</i> (L.) Pers.	Hemicryptophyte	Grass
80.	Poaceae	<i>Dactyloctenium aegyptium</i> (L.) Willd.	Hemicryptophyte	Grass
81.	Poaceae	<i>Dactyloctenium aristatum</i> Link	Therophyte	Grass
82.	Poaceae	<i>Dactyloctenium scindicum</i> Boiss.	Therophyte	Grass
83.	Poaceae	<i>Desmostachya bipinnata</i> (L.) Stapf	Therophyte	Grass
84.	Poaceae	<i>Echinochloa colonum</i> (L.) Link	Therophyte	Grass
85.	Poaceae	<i>Eleusine indica</i> (L.) Gaertn.	Therophyte	Grass
86.	Poaceae	<i>Eragrostis barrelieri</i> Dav.	Therophyte	Grass
87.	Poaceae	<i>Eragrostis ciliaris</i> (L.) R. Br.	Therophyte	Grass
88.	Poaceae	<i>Panicum turgidum</i> Forsk.	Hemicryptophyte	Grass
89.	Poaceae	<i>Phragmites karka</i> (Retz.) Trin.	Hemicryptophyte	Tall grass
90.	Poaceae	<i>Saccharum benghalense</i> Retz.	Hemicryptophyte	Tall grass

Table 1. (Cont'd.).

Sr #	Family	Plant species	Life form	Habit
91.	Poaceae	<i>Saccharum griffithii</i> Munro ex Boiss.	Hemicryptophyte	Tall grass
92.	Poaceae	<i>Saccharum spontaneum</i> L.	Hemicryptophyte	Tall grass
93.	Poaceae	<i>Sporobolus nervosus</i> Hochst.	Hemicryptophyte	Grass
94.	Polygalaceae	<i>Polygala erioptera</i> DC.	Therophyte	Herb
95.	Polygalaceae	<i>Polygala irregularis</i> Boiss	Phanerophyte	Herb
96.	Polygonaceae	<i>Calligonum polygonoides</i> L.	Phanerophyte	Shrub
97.	Polygonaceae	<i>Persicaria glabra</i> (Willd.) Gomes	Chamaephyte	Herb
98.	Rhamnaceae	<i>Ziziphus nummularia</i> (Burm.f.) Wight & Arn.	Phanerophytes	Shrub
99.	Salvadoraceae	<i>Salvadora oleoides</i> Decne.	Phanerophyte	Tree
100.	Salvadoraceae	<i>Salvadora persica</i> L.	Phanerophyte	Tree
101.	Salviniaceae	<i>Salvinia molesta</i> Mitchelle	Hydrophyte Fem	Herb
102.	Scrophulariaceae	<i>Bacopa monnieri</i> (L.) Wettstein	Chaemophyte	Herb
103.	Solanaceae	<i>Datura fastuosa</i> L.	Phanerophyte	Shrub
104.	Solanaceae	<i>Lycium edgeworthii</i> Dunal	Phanerophyte	Shrub
105.	Solanaceae	<i>Lycium ruthenicum</i> Murray	Phanerophyte	Shrub
106.	Solanaceae	<i>Physalis divaricata</i> D. Don	Therophyte	Herb
107.	Solanaceae	<i>Physalis peruviana</i> L.	Therophyte	Herb
108.	Solanaceae	<i>Solanum nigrum</i> L.	Therophyte	Herb
109.	Stereuliaceae	<i>Melhamia denhamii</i> R. Br.	Chamaephyte	Under shrub
110.	Tamaricaceae	<i>Tamarix dioica</i> Roxb.	Phanerophyte	Tree
111.	Tamaricaceae	<i>Tamarix indica</i> Willd.	Phanerophyte	Shrub
112.	Tiliaceae	<i>Corechorus tridens</i> L.	Therophyte	Herb
113.	Typhaceae	<i>Typha angustifolia</i> L.	Hemicryptophyte	Tall reed
114.	Typhaceae	<i>Typha domingensis</i> Pers.	Hemicryptophyte	Tall reed
115.	Verbenaceae	<i>Phyla nodiflora</i> (L.) Greene	Chamaephyte	Herb
116.	Zygophyllaceae	<i>Fagonia indica</i> Burm.f.	Chamaephyte	Herb/subshrub
117.	Zygophyllaceae	<i>Fagonia indica</i> var. <i>schweinfurthii</i> Hadidi	Chamaephyte	Herb/subshrub
118.	Zygophyllaceae	<i>Tribulus longipetalus</i> Viv.	Therophyte	Herb
119.	Zygophyllaceae	<i>Tribulus terrestris</i> L.	Therophyte	Herb
120.	Zygophyllaceae	<i>Zygophyllum simplex</i> L.	Therophyte	Herb

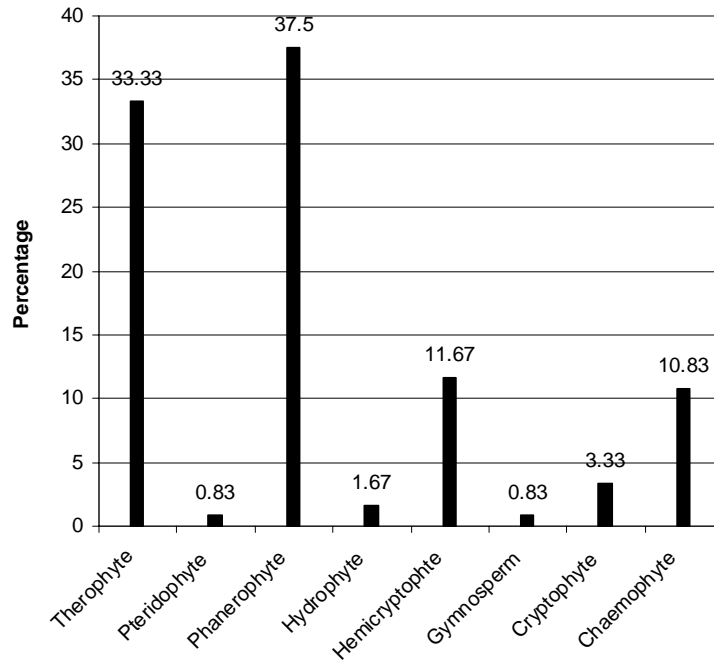


Fig. 1. Life form classes of the flora of Chotiari Wetland Complex.

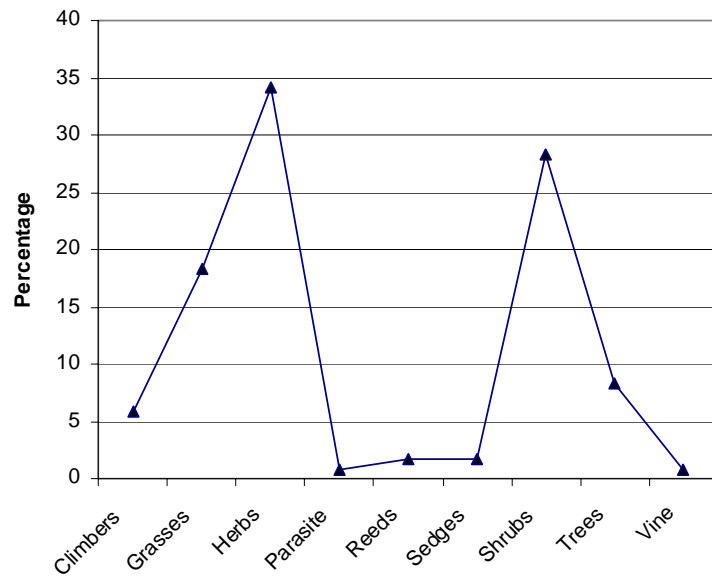


Fig. 2. Habits of plants of Chotiari Wetland Complex.

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