



ANGIOSPERMIC DIVERSITY OF ASAN WETLAND, DOON VALLEY (UTTARAKHAND), INDIA

D. K. Gupta

Department of Botany, D. A. V. (P. G.) College, Dehradun - 248 001 (Uttarakhand), India.

Abstract

The floral diversity of Asan Wetland has been found very rich. Among Angiospermic (flowering) plants *i.e.* Dicots and Monocots, which show diverse range *i.e.* herbs, sedges, shrubs and trees. There was more abundance of dicots (84.85%) than monocots (15.15%) comprising 53 and 28 species, respectively. Among monocot plants, the dominancy was shown by families like Poaceae and Cyperaceae, while the dicots was mainly represented by Asteraceae, Amaranthaceae and Solanaceae. A possible reason has been work out about the occurrence of plant species and anthropogenic influence.

Key words : Angiospermic diversity, Asan wetland, plant species, monocot and dicot plants.

Introduction

The International Biological Program (IBP) states that “A wetland is an area dominated by specific herbaceous macrophytes, the production of which takes place predominantly in the aerial environment above the water level while the plants are supplied with amounts of water that would be excessive for most other higher plants bearing aerial shoots”. The species richness in a wetland varies according to the period of flooding and transportation of chemicals in the systems. Diversity in Indian wetlands as estimated by Alfred and Nandi (2001) includes 34 groups of living organisms, comprising nearly 17,853 species. As per available literature, there is a little information on Environmental dynamics of wetlands in general (Kanjilal, 1901; Biswas, 1974; Gopal, 1982; Trisal and Zutshi, 1985; Fernandes, 1987; Ghosh, 1989; Bal Krishnan Nair, 1989; Anonymous, 1989 and Ramakrishna, 1990) and on Asan wetland in particular. In recent years, a monograph on “Asan wetland” is published by the Uttaranchal Govt. (2005), which reveals faunal and floral diversity of the wetland. Though, in the Doon valley, there are studies being conducted on the plant diversity of swamp and in this regard the work conducted by Gupta *et al.* (2006, 2008), Manas *et al.* (2009) and Sharma and Joshi (2008) can be cited. Taxonomic study of swamp forests of Doon valley was first carried out by Kanjilal in 1901, since then a number of studies have been conducted by various workers for floristic diversity (Dhyani and Joshi, 2007; Sharma and Joshi, 2008), successional studies (Som Deva and Srivastava, 1978; Srivastava *et al.*, 2000),

community dynamics (Manhas *et al.*, 2007) and biophysico-chemical parameters (Gupta *et al.*, 2008).

Gupta *et al.* (2006) undertaken studies on the biodiversity of Mothronwala swamp, which has been considered as a hot spot of Biodiversity due to its topographic and edaphic variations. Manhas *et al.* (2009) carried out studies on the Plant Diversity of a Fresh Water Swamp of Doon Valley and recorded a total of 162 plant species from the swamp; Dicotyledons contributed 71%, monocotyledons 23.5% and pteridophytes 5.6%. Poaceae with 15 genera and 17 species was the most represented family. On the other hand, in the present study at Asan wetland as many as 81 species of plants have been reported.

It seems that in spite of the work carried out by Forest Research Institute, Botanical Survey of India and Uttarakhand Government is still not sufficient. The present study is an attempt in this regard.

Study area

Present investigation has been carried out at Asan wetland, which is a small man-made wetland, geographically situated between latitude 30°24' - 30°28'N and longitude 77°40' - 77°44'E (fig. 1). As the reservoir is fed by Asan and Yamuna, the water level (controlled) attracts a variety of marsh loving birds *viz.* Egrets, Herons, Lapwings etc. and thereby the floral diversity becoming rich because of the anthropogenic influence and better condition for growth of vegetation.

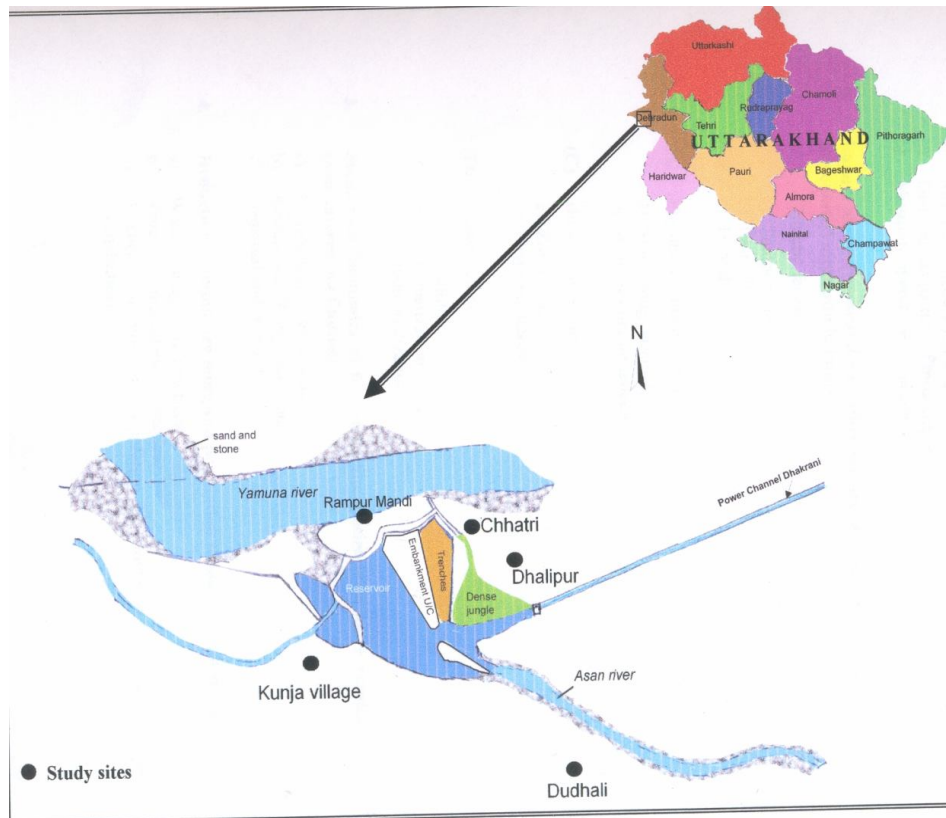


Fig. 1 : Location of the study area.

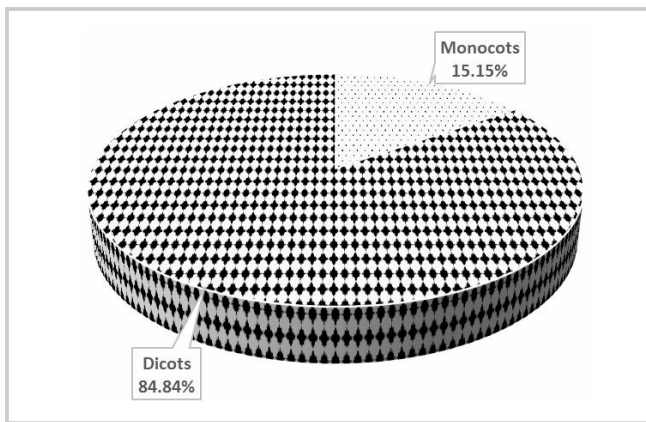


Fig. 2 : Occurrence (%) of vegetation under Monocot and Dicot families at Asan wetland.

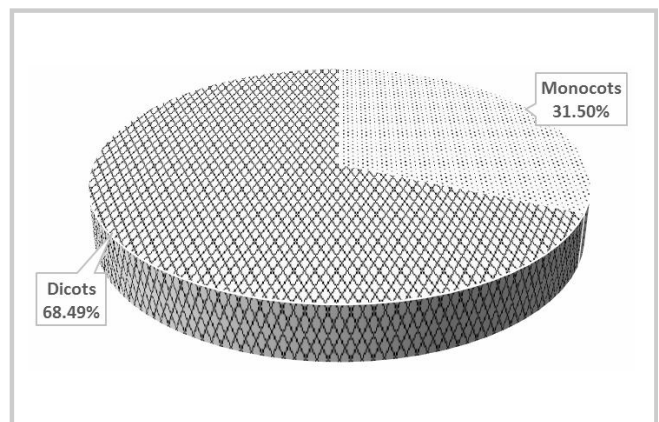


Fig. 3 : Genera wise vegetation of Monocots and Dicots at Asan wetland.

Methodology

Plant specimens were collected, classified; first on the basis of habit and then on basis of lifeforms as defined by Raunkiaer (1934). Floras written by Babu (1980) and Kanjilal (1901) were used for the nomenclature of the species. For identification purpose the authorities at Botanical Survey of India, Northern Circle, Dehradun (Uttarakhand), India were consulted.

Results

During the study period, among Angiospermic

(flowering) plants *i.e.* Dicots and Monocots, which exhibit diverse range *i.e.* herbs, sedges, shrubs and trees in the vicinity of Asan wetland, the Monocot families have been found as Cannaceae, Typhaceae, Commelinaceae, Cyperaceae (sedges) and Poaceae. Further, the members of Poaceae were highest in number (17), mainly represented by *Cynodon dactylon*, *Digitaria ciliaris*, *Imperata cylindrica*, *Paspalum paspalodes*, *Saccharum spontaneum*, *Setaria glauca* etc., whereas Cyperaceae (sedges) were represented by *Cyperus distans*, *Cyprus rotundus*, *Scirpus eractus* etc. The

Table 1 : Floral diversity of vegetation at Asan wetland during the study period.

S. no.	Plant species	Family	Habit	Division
1	<i>Justicia peploides</i> (Nees) T. Anders	Acanthaceae	Herb	Dicot.
2	<i>Achyranthes aspera</i> L.	Amaranthaceae	Herb	Dicot.
3	<i>Aerva sanguinolenta</i> (L.) Blume	Amaranthaceae	Shrub	Dicot.
4	<i>Alternanthera sessilis</i> (L.) DC.	Amaranthaceae	Herb	Dicot.
5	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Herb	Dicot.
6	<i>Asclepias curassavica</i> L.	Asclepiadaceae	Herb	Dicot.
7	<i>Cryptolepis buchananii</i> Roemer & Schult.	Asclepiadaceae	Climber	Dicot.
8	<i>Ageratum conyzoides</i> L.	Asteraceae	Herb	Dicot.
9	<i>Bidens biternata</i> (Laur.) Merrill & Sherff	Asteraceae	Herb	Dicot.
10	<i>Blumea laciniata</i> (Roxb.) DC.	Asteraceae	Herb	Dicot.
11	<i>Circium verutum</i> (D. Don) Sprengel	Asteraceae	Herb	Dicot.
12	<i>Conyza bonariensis</i> (L.) Cronquist	Asteraceae	Herb	Dicot.
13	<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Herb	Dicot.
14	<i>Erigeron karvinskianus</i> DC.	Asteraceae	Herb	Dicot.
15	<i>Eupatorium adenophorum</i> Sprengel	Asteraceae	Herb	Dicot.
16	<i>Parthenium hysterophorus</i> L.	Asteraceae	Herb	Dicot.
17	<i>Siegesbeckia orientalis</i> L.	Asteraceae	Herb	Dicot.
18	<i>Spilanthus clavata</i> L.	Asteraceae	Herb	Dicot.
19	<i>Tridax procumbens</i> L.	Asteraceae	Herb	Dicot.
20	<i>Xanthium indicum</i> Koenig	Asteraceae	Herb	Dicot.
21	<i>Bombax ceiba</i> L.	Bombacaceae	Tree	Dicot.
22	<i>Nasturtium officinale</i> R. Br.	Brassicaceae	Herb	Dicot.
23	<i>Cassia occidentalis</i> L.	Caesalpiniaceae	Shrub	Dicot.
24	<i>Canna indica</i> L.	Cannaceae	Herb	Monocot.
25	<i>Chenopodium album</i> L.	Chenopodiaceae	Herb	Dicot.
26	<i>Commelina benghalensis</i> L.	Commelinaceae	Herb	Monocot.
27	<i>Commelina maculata</i> Edgew.	Commelinaceae	Herb	Monocot.
28	<i>Murdannia nudiflora</i> (L.) Brenan	Commelinaceae	Herb	Monocot.
29	<i>Ipomoea fistulosa</i> Mart.	Convolvulaceae	Shrub	Dicot.
30	<i>Ipomoea pes-tigridis</i> L.	Convolvulaceae	Climber	Dicot.
31	<i>Cyperus distans</i> L.f.	Cyperaceae	Sedges	Monocot.
32	<i>Cyperus niveus</i> Retz.	Cyperaceae	Sedges	Monocot.
33	<i>Cyperus rotundus</i> L.	Cyperaceae	Sedges	Monocot.
34	<i>Kyllinga nemoralis</i> (J.R. & G. Foster) Dandy	Cyperaceae	Sedges	Monocot.
35	<i>Mariscus paniceus</i> (Rottboell) Vahl.	Cyperaceae	Sedges	Monocot.
36	<i>Scirpus erectus</i> Roxb. Ex Choisy	Cyperaceae	Sedges	Monocot.
37	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Herb	Dicot.
38	<i>Mallotus philippensis</i> (Lam.) Muell.-Arg.	Euphorbiaceae	Tree	Dicot.
39	<i>Dalbergia sissoo</i> Roxb.	Fabaceae	Tree	Dicot.
40	<i>Nepeta hindostana</i> (Roth) Haines	Lamiaceae	Herb	Dicot.
41	<i>Ocimum saictum</i> Linn..	Lamiaceae	Herb	Dicot.
42	<i>Rabdosia rugosa</i> (Wallich ex Benth.)	Lamiaceae	Shrub	Dicot.
43	<i>Malvastrum coromandelianum</i> (L.) Garcke	Malvaceae	Herb	Dicot.
44	<i>Sida acuta</i> Burm. F.	Malvaceae	Herb	Dicot.
45	<i>Urena lobata</i> L.	Malvaceae	Shrub	Dicot.

Table 1 continued...

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46	<i>Melia azedarach</i> L.	Meliaceae	Tree	Dicot.
47	<i>Ardisia solanacea</i> (Poiret) Roxb.	Myrsinaceae	Shrub	Dicot.
48	<i>Eucalyptus tereticornis</i> Smith	Myrtaceae	Tree	Dicot.
49	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	Herb	Dicot.
50	<i>Argemone maxicana</i> L.	Papaveraceae	Herb	Dicot.
51	<i>Arthraxon lancifolius</i> (Trin.) Hochst.	Poaceae	Grass	Monocot.
52	<i>Cynodon dactylon</i> (L.) Persoon	Poaceae	Grass	Monocot.
53	<i>Digitaria ciliaris</i> (Retz.) Koeler	Poaceae	Grass	Monocot.
54	<i>Eleusine indica</i> (L.) Gaertner	Poaceae	Grass	Monocot.
55	<i>Eragrostis minor</i> Host. Gram. Austr.	Poaceae	Grass	Monocot.
56	<i>E. tenella</i> (L.) P.Beauv. ex Roem. & Schult.	Poaceae	Grass	Monocot.
57	<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	Poaceae	Grass	Monocot.
58	<i>Imperata cylindrica</i> (L.) P.Beauv.	Poaceae	Grass	Monocot.
59	<i>Oplismenus compositus</i> (L.) P. Beauv.	Poaceae	Grass	Monocot.
60	<i>Paspalidium flavidum</i> (Retz.) A. Camus	Poaceae	Grass	Monocot.
61	<i>Paspalum paspalodes</i> (Michaux) Scribn.	Poaceae	Grass	Monocot.
62	<i>Phalaris minor</i> Retz. Obs. Bot.	Poaceae	Grass	Monocot.
63	<i>Polypogon fugax</i> Nees ex Steudel	Poaceae	Grass	Monocot.
64	<i>Saccharum spontaneum</i> L.	Poaceae	Grass	Monocot.
65	<i>Setaria glauca</i> (L.) P. Beauv.	Poaceae	Grass	Monocot.
66	<i>Setaria verticillata</i> (L.) P. Beauv.	Poaceae	Grass	Monocot.
67	<i>Themada caudata</i> (Nees) A. Camus	Poaceae	Grass	Monocot.
68	<i>Polygonum barbatum</i> L.	Polygonaceae	Herb	Dicot.
69	<i>Ranunculus scleratus</i> L.	Ranunculaceae	Herb	Dicot.
70	<i>Ziziphus mauritiana</i> Lam.	Rhamnaceae	Shrub	Dicot.
71	<i>Hedyotis corymbosa</i> (L.) Lam.	Rubiaceae	Herb	Dicot.
72	<i>Murraya koenigii</i> (L.) Sprengel	Rutaceae	Shrub	Dicot.
73	<i>Bacopa monnieri</i> Pennell	Scrophulariaceae	Herb	Dicot.
74	<i>Physalis divaricata</i> D. don	Solanaceae	Herb	Dicot.
75	<i>Solanum nigrum</i> L.	Solanaceae	Herb	Dicot.
76	<i>Solanum torvum</i> Sw.	Solanaceae	Shrub	Dicot.
77	<i>Solanum viarum</i> Dunal	Solanaceae	Herb	Dicot.
78	<i>Triumfetta rhomboidea</i> Jacquin	Tiliaceae	Herb	Dicot.
79	<i>Typha angustata</i> Bor & Chaubard	Typhaceae	Herb	Monocot.
80	<i>Celtis australis</i> L.	Ulmaceae	Tree	Dicot.
81	<i>Lantana camara</i> L.	Verbenaceae	Shrub	Dicot.

family Commelinaceae is represented by 3 members while Cannaceae and Typhaceae is represented by one member each. In all, 23 genera of Monocots comprising 28 species have been reported from Asan wetland.

As many as 29 families of dicot having 50 genera comprising 53 species have been reported from the study site. Dicot families were mainly represented by Amaranthaceae, Asteraceae, Lamiaceae, Malvaceae and Solanaceae. Among these, the members of family Asteraceae were highest (13), mainly represented by *Ageratum conyzoides*, *Eclipta prostrata*, *Eupatorium adenophorum*, *Parthenium hysterophorus*, *Tridax procumbens*, *Xanthium indicum* etc. The family

Solanaceae was represented by 4 members including *Solanum nigrum* and *Physalis divaricata*.

Discussion

In the present investigation at Asan wetland the abundance of Dicots was recorded more than the Monocots during the study period. In this regard, the present findings differ with Dhyani and Joshi (2007), Sharma and Joshi (2008) and Manhas *et al.* (2009). The possible reason for less floristic diversity in the present study may be closeness of wetland to human habitations and dependence of human population on fuel wood, fodder, food, medicinal plants etc. Sharma and Joshi

(2008) have given similar reasons for the dwindling diversity and degradation but at Mothronwala swamp of Doon valley. We found that herbs were the most dominant habit followed by shrubs among all the plant forms. Sharma and Joshi (2008) have also reported similar results from Mothronwala swamp of Doon valley. Dominance of herbs and shrubs again signify high rate of anthropogenic disturbances.

Since, there are no such studies made on Asan wetland, hence in the light of lack of literature, it is rather difficult to compare the results of present study with others. There is a need to make correlations between the availability of angiospermic plants with physico-chemical and biological variables.

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