Floristic composition and phytosociological studies of Samaspur wetland, Rae Bareli, U.P.

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The paper embodies the results obtained from floristic, phytosociological and phenological studies of Samaspur wetland, District Rae Bareli. Twenty six aquatic/marshy macrophytes and sixty ground macrophytes were recorded. The study shows that in addition to the native species, a large number of alien taxa are encountered, which have encroached the area and degraded the ecological set-up.

Key-words - Macrophytes, Phytosociology, Samaspur wetland, Rae Bareli, U.P.

INTRODUCTION

INDIA abounds in wetland resources and exhibits a significant ecological diversity owing to the variability in climatic condition and changing physiography. Wetlands are transititonal areas between aquatic and terrestrial ecosystems where the water table is usually at or adjacent to the surface of the land.

Floristic and phytosociological analyses are the prerequisite to understand the structural and functional traits of a given ecosystem (Dansereau, 1960). Although there are several known records of such studies in India (Bharucha & Dave, 1944; Arora, 1966; Singh, 1967; Misra & Misra, 1969; Rao, 1969; Kumar & Joshi, 1972; Siddiqui, 1972; Singh & Ambasht, 1980; Ambasht & Pandey, 1981; Bharadwaj, 1981; Rajwar & Gupta, 1981; Saxena *et al.*, 1982.) but from Samaspur wetland, owing to paucity of such information, the present study was undertaken to understand the major features of the ecosystem.

STUDY AREA

Ths Samaspur wetland is situated in Salon Development Block in Rae Bareli district, Uttar Pradesh. It is about 40 km apart south of Rae Bareli city and lies at 26° 2′ N Lat., 81° 28′ E Long. and 995.3 ft. above sea level. This wetland is perennial and is almost "S" shaped with the depth varying from 0.1 to 5 m. The total wetland area stretches to around 800 hectares. The land encompassing the wetland is generally "*Usar*" with evident alkaline patches. Alkalinity is very high. "Kankar Pan" is present upto a depth of one metre from the surface and the thickness varies from 10 to 20 cm at places. The maximum and minimum temperatures recorded are 46°C and 5.5°C, respectively. Since the wetland and its surroundings have almost no forest cover, the wind pressure is relatively higher and summer hot winds "loo" are severe. The main water source of the wetland is from tail ends of irrigation canal because of natural situation.

After an extensive survey for about two years (November, 1990 - March 1992), the total area of the wetland has been classified into five segments. These segments have been named after Govt. revenue records, i.e. named after the village situated adjacent to the water body.

Table 1

Sl. No.	Wetland Segments	Name
1	I	Hawkganj
2	II	Rohaniya
3	III	Gudwa Hasanpur
4	IV	Mamni
5	V	Samaspur proper

MATERIAL AND METHOD

For floristic composition, plants were collected, dried, preserved and mounted on herbarium sheets and then identified. Confirmation of identification was

done later by comparing with the plants lodged in the herbarium of Botanical Survey of India, Central Circle, Allahabad.

Phytosociological study was carried out by random sampling using quadrats of 60 x 60 cm size on the selected sites. Plants species encountered in each quadrat were identified and counted. Frequency, density and abundance were determined and subjected to Raunkiaer's 1934 frequency monitor.

RESULTS AND DISCUSSION

Hydrophytic community chiefly includes angiosperms along with a few macroscopic algae and pteridophytes. *Eichhornia crassipes* Mart. and *Typha angustata* Bory. & Chaub. forming dense population were observed throughout the course of investigation.

All twentysix aquatic/marshy macrophytes recorded in the present study are classified into six types.

Table 2

Sl. No.	Type	No. of Species Present
1	Free Floating	5
2	Rooted herbs with floating leaves	2
3	Submerged floating	8
4	Rooted submerged	4
5	Creeping herbs	3
6	Emergent marshy macrophytes	4

All the macrophytes clubbed as aquatic/marshy (Table 3) possess a great variation ranging from emergent, amphibious, creeping, free floating to submerged. *Eichhornia crassipes* Mart., *Ipomoea carnea* L., *Typha angustata* Bory. & Chaub. and *Hydrilla verticillata* Royle are, however, recognised as alien taxa. It is already known from the published literature that aliens disturb the basic ecology of the natural ecosystem by replacing the native forms and accelerating the rate of terrestrialization (Mitchell & Gopal, 1991). These invaders also upset the socio-economic aspects of the area by intervening the navigation, recreation, irrigation, aquaculture and agriculture production. Besides, they also degrade adjoining land and in turn provide shelter to the insect vectors of parasitic diseases adversely affecting the biological balance of the native wetland. Nevertheless, some of the native taxa of the Samaspur wetland such as *Ceratophyllum demersum* L. also constitute to the eutrophication (Chawla & Vishwanathan, 1986) disturbing the ecology.

Nymphaea nouchali Burm., *Ottelia alismoides* L., *Typha angustata* Bory. & Chaub., *Aponogeton* sp. and *Hydrilla verticillata* Royle are found to flower round the year; *Nymphoides indicum* Kuntze, *Ipomoea aquatica* Forsk. and *Vallisneria spiralis* L. flower during November to March. The flowering periods of remaining taxa remain erratic which is largely governed by the photo-periods.

The ground flora includes a number of ephemerals, annuals and perennials belonging to herbs, shrubs and trees. Amongst sixty species of ground macrophytes, 46 species belong to herbs, 7 each to shrubs and trees. The distribution of the ground macrophytes reveals that herbaceous plant community is dominant indicating ecological conditions more conducive to them. Species composition of the ground macrophytes is presented in Table 4.

Table 3 - Species composition of Aquatic/Marshy macrophytes

Botanical Name	Common Name	Class/Family	Present at Sites
Algae (Macroscopic)			
Chara zeylanica	Stonewort	Chlorophyceae	I, III, IV
Nitella sp.	-	Chlorophyceae	I, III, IV
Pteridophytes			
Marsilea minuta	-	Marsileaceae	II, III
M. quadriflora L.			
Azolla pinnata R. Br.	Water velvet	Salviniaceae	I, II, III, IV
Angiosperms			
Nymphaea nouchali Burm.	Kumudini	Nymphaeaceae	I, III, IV, V
Nelumbo nucifera Goertn.	Kamal	Nymphaeaceae	I, II, III, IV
Neptunia oleracea Lour.	-	Leguminosae	III, V
Jussiaea repens L.	-	Onagraceae	II, III, IV
Nymphoides indicum Kuntze	-	Gentianaceae	I, II, III, IV, V
Ipomoea aquatica Forsk.	Kalmi sag	Convolvulaceae	I, II, III, IV, V
I. carnea L.	Behaya	Convolvulaceae	I, II, III, IV, V

Botanical Name	Common Name	Class/Family	Present at Sites
Utricularia stellaris L.f.	Bladderwort	Lentibulariaceae	I, II
Ceratophyllum demersum L.	-	Ceratophyllaceae	III, IV
Hydrilla verticillata Royle	-	Hydrocharitaceae	II, III, IV, V
Vallisneria spiralis L.	Eel-grass or Patihava Khar	Hydrocharitaceae	II, III, IV, V
Ottelia alismoides L.	-	Hydrocharitaceae	II, IV
Eichhornia crassipes Mart.	Water Hyacinth or Jal Kumbhi	Pontederiaceae	I, II, III, IV, V
Typha angustata Bory. & Chaub.	Cat tail or Gond	Typhaceae	I, II, III, IV, V
Lemna paucicostata Hegelm.	Lesser duck weed	Lemnaceae	II, III, V
Spirodela polyrhiza L.	Great duck weed	Lemnaceae	II, III, V
Sagittaria sp.	-	Alismaceae	III
Potamogeton crispus L.	Pond weed	Najadaceae	II, III, IV
P. pectinatus L.	-	Najadaceae	II, IV, V
Aponogeton sp.	-	Najadaceae	II, V
Najas graminea Del.	Najas	Najadaceae	I, III
Echinochloa stagnina Beauv.		Poaceae	III, IV, V
Hygroryza aristata Retz.	-	Poaceae	IV, V
Scirpus articulatus L.	-	Cyperaceae	II, III, IV

Table 4. Species composition of Ground Vegetation

Botanical Name	Common Name	Family	Habit
Cocculus villosus DC.	-	Menispermaceae	Climbing undershrub
Portulaca oleracea L.	Kulfa	Portulaceae	Herb
Abutilon indicum Sweet Hort.	Kanghi	Malvaceae	Shrub
Sida vernoicaefolia Lamk.	Bhiunli	Malvaceae	Herb
Zizyphus nummularia W & A.	Jharber	Rhamnaceae	Shrub
Melilotus indica All.	Banmethi	Leguminosae	Herb
Acacia nilotica L.	Desi babool	Leguminosae	Tree
Butea frondosa Roxb.	Dhak	Leguminosae	Tree
Prosopis juliflora DC.	Vilayati babool	Leguminosae	Tree
Ammania baccifera L.	-	Lythraceae	Herb
Trianthema portulacastrum L.	Santhi	Aizoaceae	Herb
Oldenlandia affinis DC.	Saya	Rubiaceae	Herb
Ageratum conyzoides L.	-	Asteraceae	Herb
Blumea oxyodonta DC.	Kakronda	Asteraceae	Herb
Vernonia cinerea Less.	-	Asteraceae	Herb
Eclipta alba Hassk.	-	Asteraceae	Herb
Launaea asplenifolia Hook.	-	Asteraceae	Rosette herb
Vicoa indica DC.	-	Asteraceae	Herb
Xanthium strumarium L.	-	Asteraceae	Herb
Anagallis arvensis L.	-	Primulaceae	Herb
Calotropis procera R. Br.	Sated ak	Asclepiadaceae	Undershrub
Enicostema axillare Bl.	-	Gentianaceae	Herb
Evolvulus nummularius L.	-	Convolvulaceae	Herb
Ipomoea reptans Poir.	Behaya	Convolvulaceae	Herb
Scoparia dulcis L.	-	Scrophulariaceae	Undershrub

Botanical Name	Common Name	Family	Habit
Verbascum chinense L.	-	Scrophulariaceae	Undershrub
Hygrophila polysperma Anders.	-	Acanthaceae	Stout herb
Astercanthea longifolia L.	Tal-makhana	Acanthaceae	Herb
Ruellia sp.	Menow-weed	Acanthaceae	Herb
Rungia sp.	-	Acanthaceae	Herb
Clerodendrum indicum Kuntze	Turck's turban	Verbenaceae	Shrub
Phyla nodiflora Greene.	-	Verbenaceae	Herb
Ocimum americanum L.	Jungalee Tulsi	Lamiaceae	Branched shrub
Boerhaavia diffusa L.	-	Nyctaginaceae	Branched herb
Celosia argentea L.	-	Amaranthaceae	Erect herb
Amaranthus spinosus L.	Kataili-chaulai	Amaranthaceae	Herb
Achyranthus aspera L.	-	Amaranthaceae	Herb
Alternanthera sessilis R.Br.	-	Amaranthaceae	Herb
Polygonum barbatum L.	-	Polygonaceae	Herb
Polygonum glabrum Willid.	-	Polygonaceae	Herb
Polygonum plebeium Br.	-	Polygonaceae	Herb
*Euphorbia hirta*L.	-	Euphorbiaceae	Herb
Ficus religiosa L.	Pipal	Moraceae	Tree
Ficus bengalensis L.	Bargad	Moraceae	Tree
Phoenix sp.	Jungalee Khajoor	Arecaceae	Tree
Madhuca sp.	Mahua	Sapotaceae	Tree
Cynodon dactylon Pers.	Doob	Poaceae	Grass
Chloris barbata Sw.	-	Poaceae	Grass
Desmostachya bipinnata L.	Kusa	Poaceae	Grass
Dichanthium annulatum Stapf.	-	Poaceae	Grass
Eragrostis sp.	-	Poaceae	Grass
Panicum fluitans Retz.	Gunara	Poaceae	Grass
Panicum paludosum Retz.	-	Poaceae	Grass
Paspalum paspaloides L.	-	Poaceae	Grass
Saccharum munja L.	Moonj	Poaceae	Grass
Sporobolus sp.	-	Poaceae	Grass
Vetiveria zizanioides L.	Khas	Poaceae	Grass
Cyperus difformis L.	Motha	Cyperaceae	Sedge
Cyperus rotundus L.	Motha	Cyperaceae	Sedge
Scirpus sp.	-	Cyperaceae	Sedge

Phytosociology of the Ground Vegetation

The phytosociological study was repeated at three months interval for consecutive two years. Results on phytosociology of the ground vegetation are presented in Tables 5-10. It is imperative from the data, that *Cynodon dactylon* Pers., *Cyperus difformis* L., *Cyperus rotundus* L., *Eragrostis* sp. and *Panicum* sp. have higher values of frequency, density and abundance envisaging their wide ecological amplitude whereas *Anagallis arvensis* L., *Euphorbia hirta* L., *Ocimum americanum* L., *Polygonum plebeium* Br., *Eclipta alba* Hassk., *Melilotus parviflora* Desf. and *Xanthium strumarium* L. have low values for the same phytosociological parameters delimiting the ecological amplitude.

Phenology of Ground Vegetation

The phenology of the ground vegetation was conducted through regular survey and observations of the study sites of the wetland. Observations on the vegetation are presented in Table 11. Maximum number of flowering and fruiting species were observed in September and December 1991, respectively at the site III.

Table 5. Phytosociology of Ground Vegetation (Nov. 1990)

Name of the Species	Quadrats			Laid		Down					Total No. of Individuals of the species	Total No. of Quadrats in which species occurred	Total No. of Quadrats Studies	Frequency %	Frequency Class	Density	Abundance
	1	2	3	4	5	6	7	8	9	10							
Acacia nilotica L.	-	+	-	-	-	-	-	-	-	+	3	2	10	20	A	0.3	1.5
Ammania baccifera L.	-	-	+	-	-	+	+	-	+	+	14	5	10	50	C	1.4	2.8
Blumea oxyodonta DC.	+	-	-	-	-	-	-	-	-	+	18	2	10	20	A	1.8	9
Butea frondosa Roxb.	-	+	-	-	+	-	-	-	+	+	11	4	10	40	B	1.1	2.7
Cyndon dactylon Pers.	+	+	+	+	+	+	+	+	+	+	1678	10	10	100	E	167.8	167.8
Cyperus rotundus L., *C. difformis* L.	+	+	+	+	-	+	+	-	+	+	1647	8	10	80	D	164.7	205.8
Eragrostis sp.	-	-	-	-	-	-	-	+	-	-	43	1	10	10	A	4.3	4
Eclipta alba Hassk.	-	-	-	+	-	+	-	-	-	-	4	2	10	20	A	0.4	2
Euphorbia hirta L.	-	-	-	-	-	-	-	-	+	-	1	1	10	10	A	0.1	1
Evolvulus nummularius L.	-	-	-	-	+	-	-	-	-	-	65	1	10	10	A	6.5	65
Ipomoea reptans Poir.	+	+	+	+	+	+	+	-	-	+	59-	8	10	80	D	5.9	7.3
Anagallis arvensis L.	-	-	-	-	-	-	+	-	-		4	1	10	10	A	0.4	4.0
Launaea asplenifolia Hook.	-	+	+	-	+	+	+	-	-	-	77	5	10	50	C	7.7	15.4
Ocimum americanum L.	+	-	-	-	-	-	-	-	-	-	3	1	10	10	A	0.3	3
Oldenlandia affinis DC.,	-	-	-	+	+	-	-	-	-	-	8	2	10	20	A	0.8	4
Panicum fluitans Retz.	+	+	+	+	+	+	+	+	+	+	7555	10	10	100	E	755.5	755.5
Peristrophe bicalyculata Nees.	+	-	-	-	-	-	-	-	-	-	2	1	10	10	A	0.2	2
Phyla nodiflora Greene	-	+	-	-	+	-	-	-	-	-	381	2	10	20	A	38.1	19.5
*Polygonum barbatum*L.	+	-	-	-	-	+	-	-	+	-	19	3	10	30	B	1.9	6.33
Scirpus articulatus L.	+	+	-	+	-	-	+	-	+	-	442	5	10	50	C	44.2	88.4
Saccharum spontaneum L.	-	-	+	-	+	+	-	+	+	-	192	5	10	50	C	19.2	38.4
Typha angustata Bory. & Chaub.	-	+	-	+	-	-	+	+	-	-	16	4	10	40	B	1.6	4.0
Xanthium strumarium L.	-	-	-	-	-	+	-	-	-	-	2	1	10	10	A	0.2	2.0

Table 6. Phytosociology of Ground Vegetation (March 1991)

Name of the Species	Quadrats Laid Down										Total No. of Individuals of the species	Total No. of Quadrats in which species occurred	Total No. of Quadrats Studies	Frequency %	Frequency Class	Density	Abundance
	1	2	3	4	5	6	7	8	9	10							
Argemone mexicana L.	-	-	+	-	-	+	-	-	+	-	8	3	10	30	B	0.8	26.6
Alternanthera sessilis L.	+	-	+	-	-	+	-	-	+	-	16	4	10	40	B	1.6	4
Ammania baccifera L.	+	-	-	-	+	-	-	-	-	+	11	3	10	30	B	1.1	3.6
Calotropis procera R.Br.	-	-	-	-	+	-	-	-	+	-	3	2	10	20	A	0.3	1.5
Cynodon dactylon Pers.	+	+	+	+	+	+	+	+	+	+	1358	10	10	100	E	135.8	135.8
Cyperus rotundus L. *C.difformis* L.	+	+	+	+	+	+	+	+	+	+	857	10	10	100	E	85.7	85.7
Eragrostis sp.	+	+	+	-	+	+	-	+	-	+	180	7	10	70	D	18.0	25.7
Eclipta prostrata Hassk.	-	+	-	-	+	-	-	+	-	-	9	3	10	30	B	0.9	3
Euphorbia hirta L.	+	-	-	+	-	-	-	-	-	-	5	2	10	20	A	0.5	2.5
Ipomoea reptans Poir.	+	-	+	-	+	-	-	+	+	-	31	5	10	50	C	3.1	6.2
Lindenbergia sp.	+	-	-	-	+	-	-	-	-	-	7	2	10	20	A	0.7	3.5
Launaea asplennifolia Hook.	+	-	+	-	-	-	-	+	-	+	32	4	10	40	B	3.2	8.0
Melilotus alba Pers.	-	+	-	+	-	+	-	-	+	-	13	4	10	40	B	1.3	3.2
Ocimum sp.	-	+	-	-	-	-	-	-	-	-	2	1	10	10	A	0.2	2.0
Panicum fluitans Retz.	+	+	+	+	+	+	+	+	+	+	1593	10	10	100	E	159.3	159.3
Phyla nodiflora Greene	+	-	-	-	+	-	+	-	-	-	79	3	10	30	B	7.9	26.3
Polygonum glabrum Willd.	-	+	-	+	-	-	+	-	-	-	12	3	10	30	B	1.2	4.0
Scirpus articulatus L.	+	-	+	-	+	-	+	+	-	-	64	5	10	50	C	6.4	12.8
Saccharum spontaneum L.	-	+	-	-	+	-	+	-	+	+	135	5	10	50	C	13.5	27
Sida cordata L.	-	+	-	-	-	-	+	-	-	-	13	2	10	20	A	1.3	6.5

Table 7. Phytosociology of Ground Vegetation (June 1991)

Name of the Species	Quadrats Laid Down										Total No. of Individuals of the species	Total No. of Quadrats in which species occurred	Total No. of Quadrats Studies	Frequency %	Frequency Class	Density	Abundance
	1	2	3	4	5	6	7	8	9	10							
Cynodon dactylon Pers.	+	+	+	+	+	+	+	+	+	+	2794	10	10	100	E	279.4	279.4
Cyperus rotundus L. *C. difformis* L.	+	+	+	+	+	+	+	+	+	+	266	8	10	80	D	26.6	33.25
Desmostachya bippinata L.	-	-	-	-	+	-	-	+	+	+	58	4	10	40	B	5.8	14.5
Dichanthium annulatum Stapf.	-	-	+	-	-	-	-	-	-	+	88	2	10	20	A	8.8	44.0
Eragrostis sp.	-	+	-	-	+	+	-	+	+	+	950	6	10	60	C	95.0	158.3
Euphorbia hirta L.	+	-	-	-	-	-	-	-	-	-	4	1	10	10	A	0.4	4.0
Evolvulus nummularius L.	-	-	-	-	-	+	-	+	-	-	16	2	10	20	A	1.6	8.0
Ipomoea reptans Poir.	-	-	+	-	+	-	-	+	-	+	17	4	10	40	B	1.7	4.25
Launaea asplennifolia Hook.	+	-	-	-	+	+	+	+	+	+	78	7	10	70	D	7.8	11.1
Panicum paludosum Roxb.	-	-	-	+	-	-	+	-	-	-	146	2	10	20	A	14.6	73.0
Panicum sp.	-	-	-	-	+	-	-	+	-	-	183	2	10	20	A	18.3	91.5
Paspalum paspaloides L.	-	-	-	+	-	+	-	-	+	-	156	3	10	30	B	15.6	52
Phyla nodiflora Greene	-	-	+	+	-	+	+	+	+	+	171	7	10	70	D	17.1	24.4
Polygonum sp.	-	+	-	-	-	-	+	-	-	-	9	2	10	20	A	0.9	4.5
Sporobolus sp.	-	+	-	+	-	-	+	+	+	-	581	5	10	50	C	58.1	116.2
Vernonia sp.	+	+	-	-	-	+	+	-	-	-	14	4	10	40	B	1.4	3.5

Table 8. Phytosociology of Ground Vegetation (Sept. 1991)

Name of the Species	Quadrats Laid Down 1	2	3	4	5	6	7	8	9	10	Total No. of Individuals of the species	Total No. of Quadrats in which species occurred	Total No. of Quadrats Studies	Frequency %	Frequency Class	Density	Abundances
Anagallis arvensis L.	-	-	-	-	-	-	-	-	-	+	4	1	10	10	A	0.4	4
Blumea oxyodonta DC.	-	-	-	-	+	+	+	+	+	-	44	5	10	50	C	4.4	8
Cynodon dactylon Pers.	+	+	+	+	+	+	+	+	+	+	2974	10	10	100	E	297.4	297.4
Cyperus rotundus L. / *C. difformis* L.	+	+	-	+	+	+	-	+	+	+	522	8	10	80	D	52.2	65.2
Dactyloctenium sp.	-	+	+	+	-	+	-	+	-	+	179	6	10	60	C	17.9	29.8
Desmostachya sp.	-	-	-	+	-	+	-	-	-	+	11	3	10	30	B	1.1	3.3
Eragrostis sp.	+	+	+	-	+	+	+	+	+	+	2050	9	10	90	E	205.0	227.7
Euphorbia hirta L.	-	-	+	-	-	-	-	+	-	-	3	2	10	20	A	0.3	1.5
Evolvulus nummularius L.	+	+	-	-	+	+	-	+	-	+	46	6	10	60	C	4.6	7.6
Ipomoea reptans Poir.	-	+	+	-	+	+	-	+	-	-	29	5	10	50	C	2.9	5.8
Launaea asplennifolia Hook.	+	+	+	-	+	+	+	-	+	-	77	7	10	70	D	7.7	11.0
Ocimum americanum L.	-	-	-	+	-	-	-	-	+	-	6	2	10	20	A	0.6	2.0
Phyla nodiflora Greene.	+	+	+	-	-	-	+	+	-	+	37	6	10	60	C	3.7	6.1
Polygonum sp.	-	+	-	-	-	+	-	-	+	-	06	3	10	30	B	0.6	2.0
Scirpus articulatus L.	-	-	-	+	+	-	-	+	-	+	57	4	10	40	B	5.7	14.2
Sida cordifolia L.	-	-	+	-	-	-	-	-	-	+	5	2	10	20	A	0.5	2.5
Saccharum spontaneum L.	+	-	-	+	-	+	-	-	-	-	9	3	10	30	B	0.9	3.0
Sporobolus sp.	+	+	+	-	+	-	+	-	+	-	83	6	10	60	C	8.3	13.8

Table 9. Phytosociology of Ground Vegetation (Dec. 1991)

Name of the Species	Quadrats Laid Down 1	2	3	4	5	6	7	8	9	10	Total No. of Individuals of the species	Total No. of Quadrats in which species occurred	Total No. of Quadrats Studies	Frequency %	Frequency Class	Density	Abundance
Ageratum conyzoides L.	-	-	+	-	+	-	-	-	+	-	23	3	10	30	B	2.3	7.6
Anagallis arvensis L.	-	-	+	-	+	-	-	-	-	-	13	2	10	20	A	1.3	6.5
Blumea oxyodonta DC.	+	+	+	+	-	+	+	-	-	-	44	6	10	60	C	4.4	7.3
Cynodon dactylon Pers.	+	+	+	+	+	+	+	+	+	+	2827	10	10	100	E	282.7	282.7
Cyperus rotundus L. / *C. Difformis* L.	+	-	+	+	+	+	+	+	+	-	273	8	10	80	D	27.3	34.1
Dactyloctenium sp.	-	+	+	+	+	-	+	+	-	-	217	6	10	60	C	21.7	36.1
Dianthus annulatum L.	+	-	+	-	-	+	-	-	+	+	78	5	10	50	C	7.8	15.6
Eclipta alba Hassk.	+	-	+	-	-	-	-	-	-	-	5	2	10	20	A	0.5	2.5
Eragrostis sp.	+	+	+	+	+	-	+	+	+	+	1918	9	10	90	E	191.8	213.1
Ipomoea reptans Poir.	-	+	-	-	+	+	+	-	+	-	16	5	10	50	C	1.6	3.2
Launaea asplennifolia Hook.	+	+	+	+	-	+	+	+	-	-	68	7	10	70	D	6.8	9.7
Melilotus parviflora Desf.	+	-	-	-	+	-	-	-	-	-	11	2	10	20	A	1.1	5.5
Phyla nodiflora Greene.	+	-	-	+	+	+	+	-	+	-	28	6	10	60	C	2.8	4.6
Polygonum barbatum L.	-	+	-	-	+	-	+	+	+	-	17	5	10	50	C	1.7	3.4
Polygonum plebeium Br.	-	+	-	-	-	+	-	-	-	-	11	2	10	20	A	1.1	5.5
Rungia sp.	-	+	-	-	-	-	+	-	-	-	14	2	10	20	A	1.4	7.0
Saccharum spontaneum L.	-	+	+	-	+	+	-	+	-	-	72	5	10	50	C	7.2	14.4
Sporobolus sp.	+	-	+	-	+	+	+	+	-	+	226	7	10	70	D	22.6	32.2

Table 10. Phytosociology of Ground Vegetation (March 1992)

Name of the Species	Quadrats Laid Down										Total No. of Individuals of the species	Total No. of Quadrats in which species occurred	Total No. of Quadrats Studies	Frequency %	Frequency Class	Density	Abundance
	1	2	3	4	5	6	7	8	9	10							
Achyranthus aspera L.	-	+	-	-	+	-	-	+	-	-	7	3	10	30	B	0.7	2.3
Abutilon indicum Sweet Hort.	-	-	-	+	-	+	-	-	-	+	4	3	10	30	B	0.4	1.3
Ageratum conyzoides L.	+	-	+	+	+	-	-	-	+	-	17	5	10	50	C	1.7	3.4
Blumea oxyodonta DC.	+	-	+	-	-	+	-	+	+	+	31	6	10	60	C	3.1	5.1
Cynodon dactylon Pers.	+	+	+	+	+	-	+	+	+	+	2411	9	10	90	E	241.1	267.8
Cyperus rotundus L. *C. difformis* L.	+	+	-	+	+	+	-	+	+	-	627	7	10	70	D	62.7	83.8
Dactyloctenium sp.	-	+	-	+	+	-	+	+	-	-	103	5	10	50	C	10.3	2.6
Desmostachya sp.	-	+	+	-	+	-	+	-	-	+	18	5	10	50	C	1.8	3.6
Eclipta alba Hassk.	+	-	-	-	+	-	+	-	+	+	12	4	10	40	B	1.2	3.0
Eragrostis sp.	+	+	+	-	+	+	+	+	+	+	1426	9	10	90	E	142.6	158.4
Ipomoea reptans Poir.	-	+	+	-	-	-	-	+	+	-	12	4	10	40	B	1.2	3.0
Launaea asplennifolia Hook.	-	-	+	+	+	-	+	+	+	+	58	7	10	70	D	5.8	8.2
Melilotus parviflora Desf.	-	+	-	-	-	-	-	-	-	-	4	1	10	10	A	0.4	4.0
Ocimum americanum L.	+	-	-	-	-	-	+	-	-	-	3	2	10	20	A	0.3	1.5
Phyla nodiflora Greene	+	+	-	+	+	+	-	-	+	+	29	7	10	70	D	2.9	4.1
Polygonum sp.	-	+	-	+	-	-	+	-	-	-	5	3	10	30	B	0.5	1.6
Saccharum spontaneum L.	-	-	+	-	+	-	+	-	-	+	7	4	10	40	B	0.7	1.7
Sporobolus sp.	-	+	+	+	+	+	-	-	+	-	201	6	10	60	C	20.1	33.5
Xanthium strumarium L.	-	-	+	+	-	-	-	-	-	-	5	2	10	20	A	0.5	2.5

Table 11. Phenology of Ground Vegetation

Month	Site	No. of Species		
		In Vegetative Stage	In Flowering Stage	In Fruiting Stage
NOV. (1990)	I	8	3	10
	II	6	5	2
	III	10	9	8
	IV	6	3	2
	V	5	3	7
MARCH (1991)	I	6	7	5
	II	3	6	8
	III	13	10	9
	IV	4	6	3
	V	6	5	4
JUNE (1991)	I	5	4	9
	II	7	5	4
	III	8	6	9
	IV	4	6	7
	V	6	3	2
SEPT. (1991)	I	6	7	9
	II	6	5	4
	III	3	25	11
	IV	8	5	2
	V	4	4	-
DEC. (1991)	I	7	5	11
	II	6	4	3
	III	9	19	12
	IV	9	4	2
	V	5	4	8
MARCH (1992)	I	4	8	6
	II	5	7	9
	III	12	13	9
	IV	3	7	2
	V	7	5	7

In-depth analysis of the study has revealed that most of the native plant species of Samaspur wetland are endangered owing to the heavy anthropogenic pressure on one hand and encroachment by alien taxa on the other. If the process continues and remedial measures are not taken immediately then the total ecosystem and biological balance of the area shall be damaged.

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