

A Comparative Account of Diversity of Hydrophytes in Some Inland Wetlands (Pariej, Kanewal and Wadhwana) of Central Gujarat

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Abstract

The present study compares diversity of hydrophyte species of three inland wetlands of Central Gujarat (Pariej, Kanewal and Wadhwana wetlands.). The study had recorded occurrence of total 19 species of hydrophytes that included 8 species of rooted submerged, 1 species of free floating, 5 rooted species with floating leaves and 5 species of emergent hydrophyte. Relatively higher diversity of hydrophytic plant species was recorded in Pariej Wetland followed by Kanewal Wetland and Wadhwana Wetland.

Keywords: Habitat, hydrophyte, Kanewal, Pariej, species, vegetation, Wadhwana, wetland

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INTRODUCTION

Wetlands are one of the most productive and fertile ecosystems on earth. They cover about 6.4% of the land area of the earth [1]. In India, wetlands cover about 1–5% of geographical area of the country supporting about a fifth of the known biodiversity [2]. Gujarat has a variety of coastal and inland wetland systems [3]. The inland wetlands include, freshwater ponds, lakes, rivers, irrigation reservoirs, marshes and waterlogged areas while the coastal wetlands include salt marshes and salt-pans, creeks, mudflats, estuaries, mangrove swamps and coral reefs. As per SAC (2011) [2], Gujarat has total 23,891 wetlands (inclusive of Inland and Coastal wetlands), of which, 9,708 wetlands are those having an area less than 2.25 ha. Total area of these 23,891 wetlands has been estimated at 34,749.50 sq. km which accounts for about 17.56% of geographical area of the State and 22.7% of the total wetland area of the country. The area of the State under inland wetlands (rivers, streams, tanks, ponds, oxbow lake) is approximately 6,582 sq. km and that under coastal wetlands (inter-tidal flats, creeks, mangroves, coral reefs, sand/beach, coastal marsh etc.) has been approximately 28,071 sq.

km [2]. The wetland has two classes of plants, the hydrophytes (plants in water) and halophytes (plants growing in saline soil) [4]. The present comparative study of three inland wetlands has been carried out for knowing the diversity of the hydrophytes of these important wetlands of Gujarat. Pariej Wetland is one of the eight nationally important wetlands in Gujarat which are identified by the Ministry of Environment Forest Climate Change (MoEFCC). Presently, this wetland comes under the purview of the State Irrigation Department [5]. Kanewal is also an Important Bird and Biodiversity Area (IBA) of India. As per SACON, it is a Rank-1 (i.e., top-ranking) priority wetland from the viewpoint of biodiversity. It is the largest one among numerous freshwater man-made wetlands in two neighbouring districts, viz. Kheda and Anand. Wadhwana Wetland is one of the eight nationally important wetlands identified by the National Wetland Protection Committee (NWCP) of MoEFCC. It is also an IBA site and one of the Rank-1 prioritized wetlands from Gujarat as per Salim Ali Centre for Ornithology and Natural History (SACON) [6]. This is a man-made wetland having an Open Water as the predominant habitat component within it.

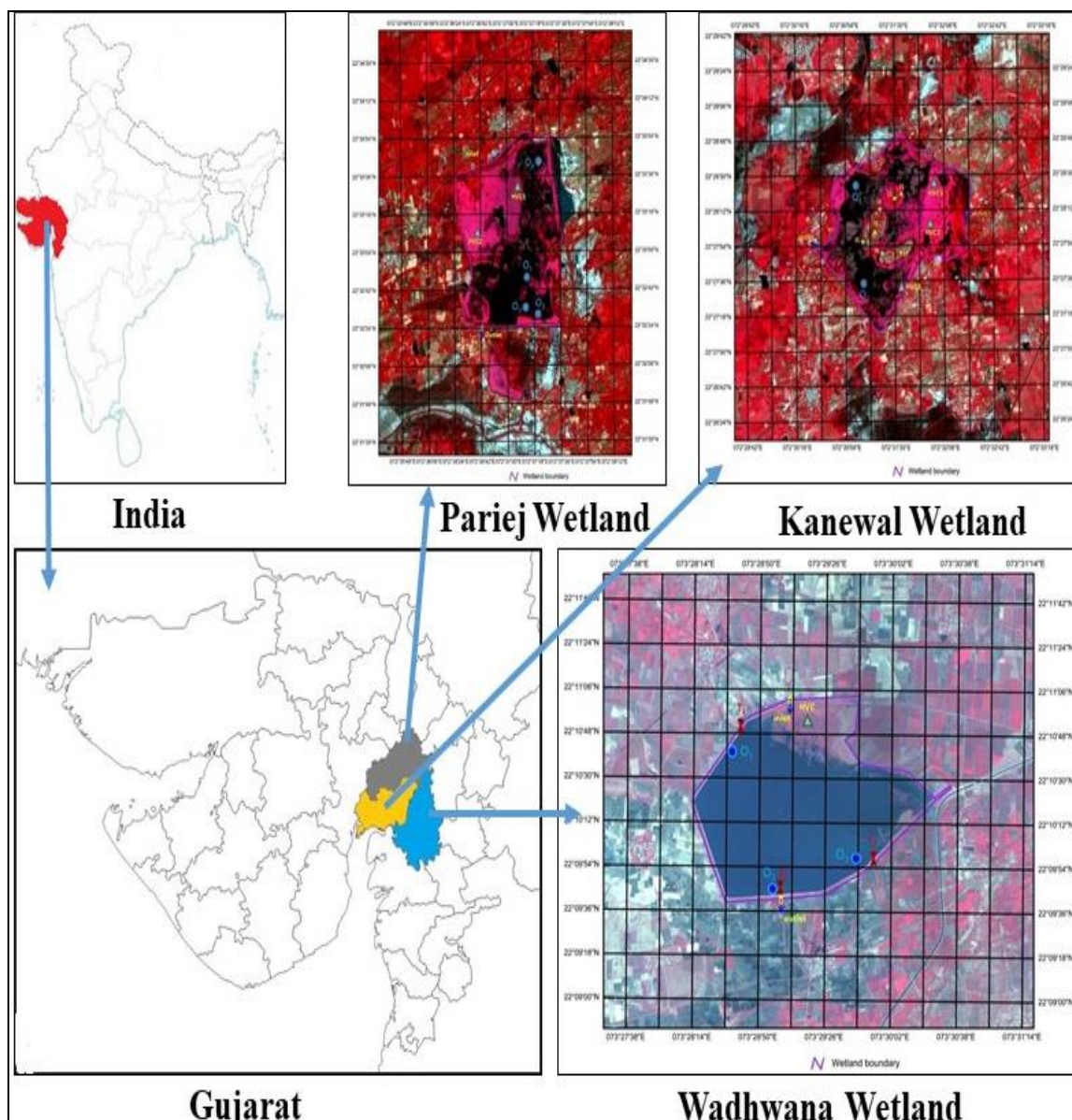


Fig. 1: Study Area including Pariej, Kanewal and Wadhwana Wetlands.

STUDY AREA

The study covered three wetlands of Central Gujarat, viz., Pariej Wetland, Kanewal Wetland and Wadhwana Wetland (Figure 1).

Pariej Wetland is located at 22°33'05"N latitude and 72°36'52"E longitude in Matar taluka of Kheda district. It is located at a distance of 60 km from Ahmedabad, 24 km from Kheda and 30 km from Khambhat. This is an irrigation reservoir having an area of 5 sq. km and depth varying from 2.6 m to 3.2 m.

Kanewal Wetland is located at 22°27'54"N latitude and 75°31'30"E longitude. It is an

irrigation reservoir located at a distance of about 30 km North of the tip of Gulf of Khambhat and around 50 km South East of the southern portion of Nal Sarovar [7]. It is located between the estuaries of Sabarmati and Mahisagar rivers.

Wadhwana Wetland (22°09'42"N latitude and 73°28'32"E longitude) is an irrigation reservoir located in Vadodara district. It was excavated in 1909-1910 by Shrimant Maharaja Sir Sayajirao Gaekwad III. It is located at a distance of 43 km from Vadodara. The area of Wadhwana Wetland is 5.8 sq. km [8] and its perimeter is 11 km [7].

MATERIALS AND METHODS

For the floral study, a grid-based stratified random sampling was carried out in each wetland (i.e. Pariej, Kanewal and Wadhvana Wetlands). The entire area of each of the wetlands was divided in 500 m x 500 m grid. The grids were decided and marked in such a way that each sampling grid would represent a type of habitat. The data for the hydrophytes was collected from selected grid-based on habitat stratification. Pariej Wetland endowed with six habitat components, i.e. inlet, outlet, open water, emergent hydrophytic vegetation was cover and water with decomposing submerged vegetation mat. Kanewal Wetland had seven habitat components, i.e. inlet, outlet, water with *Nymphaea/Nelumbo* cover, water with decomposing vegetation mat, emergent hydrophytic cover, aquatic area (including floating-leaved hydrophyte area) near an island and open water area. Similarly, Wadhvana Wetland had four habitat components, i.e. inlet, outlet, open water and hydrophytic vegetation growth. The plants were identified based on micro-morphological plants features and with the help of the available literature [9–12].

RESULTS AND DISCUSSION

A total of 19 species of hydrophytes were recorded from the three inland wetlands, viz., Pariej, Kanewal and Wadhvana Wetlands of Central Gujarat. It included 8 species of rooted submerged, 1 species of free floating, 5 rooted species with floating leaves and 5 species of emergent hydrophytes (Table 1). Six species were common to all three wetlands, viz, *Hydrilla verticillata* (L.f.) Royle, *Potamogeton nodosus* Poir., *Ipomoea aquatica* Forssk (submerged

rooted hydrophytes), *Nelumbo nucifera* Gaertn. and *Nymphoides indica* (L.) Kuntze. (rooted hydrophytes with floating leaves) and *Typha domingensis* (an emergent hydrophyte).

In Pariej Wetland, a total of 17 species of hydrophytes plants were recorded that included 7 species of submerged, 1 species of free floating, 5 species of rooted with floating leaves and 4 species of emergent hydrophytes (Figure 2). Emergent vegetation, i.e., *Typha domingensis* was present towards the periphery of the wetland. The water was endowed with the floating leaves vegetation, i.e., *Nymphaea nouchali*, *Nymphoides indica*, *Nelumbo nucifera* etc.

In Kanewal Wetland, total 13 species of hydrophytes were recorded that included 6 species of submerged, 4 species of rooted with floating leaves and 3 species of emergent (Figure 2). Luxuriantly growing *Nymphaea* and *Nelumbo* were observed in Kanewal Wetland intermitted by the sedges. The fringes of the wetland were occupied by *Typha* and *Eichornia*. The dominance of the *Najas marina*, *Hydrilla verticillata* and *Najas marina* was recorded. The Western shore of the wetland had many agricultural fields especially the paddy fields.

Wadhvana Wetland had a total of 9 species of hydrophytes including 2 species of submerged, 4 species of rooted with floating leaves and 3 species of emergent (Figure 2). The emergent hydrophytes were dominant on the western shore of the wetland as well as towards Simaliya village.

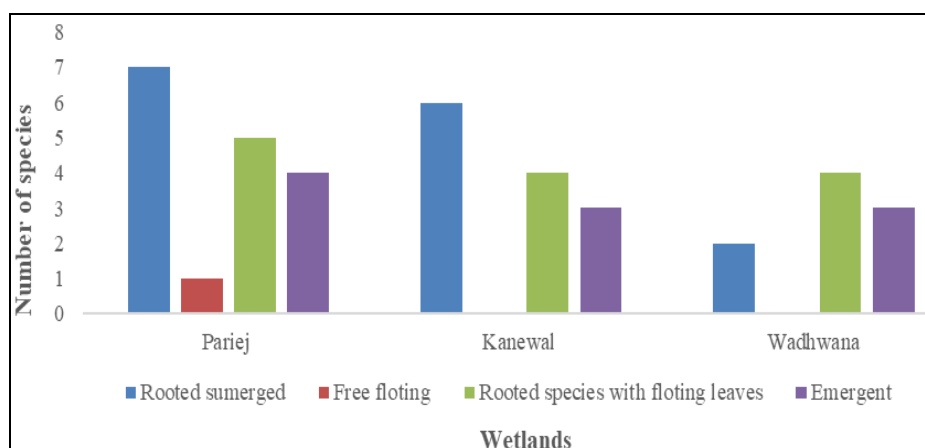


Fig. 2: Comparison of species richness of Hydrophytes in three Wetlands of Central Gujarat.

Table 1: List of Hydrophytes in Pariej, Kanewal and Wadhvana Wetlands(Central Gujarat).

Sr. No.	Species	Family	Pariej	Kanewal	Wadhvana
<i>A. Rooted submerged</i>					
1	<i>Chara</i> sp.	Characeae	√	-	-
2	<i>Hydrilla verticillata</i> (L.f.) Royle	Hydrocharitaceae	√	√	√
3	<i>Najas marina</i> L.	Hydrocharitaceae	√	√	-
4	<i>Potamogeton crispus</i> L.	Potamogetonaceae	√	√	-
5	<i>Potamogeton nodosus</i> Poir.	Potamogetonaceae	√	√	√
6	<i>Stuckenia pectinata</i> (L.) Borner	Potamogetonaceae	√	-	-
7	<i>Vallisneria spiralis</i> L.	Hydrocharitaceae	√	√	-
8	<i>Utricularia</i> sp.	Lentibulariaceae	-	√	-
<i>B. Free floating</i>					
1	<i>Lemna minor</i> L.	Araceae	√	-	-
<i>C. Rooted species with floating leaves</i>					
1	<i>Eichhornia crassipes</i> (Mart.) Solms	Pontederiaceae	√	√	-
2	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	√	√	√
3	<i>Nelumbo nucifera</i> Gaertn.	Nelumbonaceae	√	√	√
4	<i>Nymphaea nouchali</i> Burm.f.	Nymphaeaceae	√	-	√
5	<i>Nymphoides indica</i> (L.) Kuntze	Gentianaceae	√	√	√
<i>D. Emergent</i>					
1	<i>Cyperus rotundus</i> L.	Cyperaceae	√	-	√
2	<i>Fimbristylis littoralis</i> Gaudich.	Cyperaceae	√	-	-
3	<i>Persicaria glabra</i> (Willd.) M.Gomex	Polygonaceae	√	√	-
4	<i>Typha domingensis</i> Pers.	Typhaceae	√	√	√
5	<i>Blasmus rufus</i> (Huds.) Link	Cyperaceae	-	√	√
Note: - √ : present					
- : absent					

CONCLUSION

The three wetlands of Central Gujarat viz., Pariej Wetland, Kanewal Wetland and Wadhvana Wetland have at least 19 species of hydrophytes. It was found that species richness of the rooted submerged plants was highest followed by that of rooted species with floating leaves, emergent and free floating. Pariej Wetland had maximum hydrophytic species richness among all the three wetlands studied.

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