

## Diversity and behaviour of waterfowl in Santragachi Jheel, West Bengal, India, during winter season

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Santragachi Jheel is a 12.75ha wetland situated beside the Santragachi Railway Station (S.E.Rly), on the west bank of River Ganga, in the vicinity of Kolkata (= Calcutta) city. It is surrounded by dense human habitations, railway yards and small-scale industrial complexes. In the centre of the water body there are several small islands. The maximum depth of water is 2m. The jheel has large trees along its banks, which provide shelter and food for many species of birds. Water Hyacinth (*Eichhornia crassipes*) proliferates in the jheel. The most noticeable threats to the wetland include industrial effluent from railway yards and industries and, domestic sewage from surrounding houses and nearby shops. The excessive growth of emergent and floating vegetation during certain seasons also affects the population dynamics of waterbirds.

The present study was conducted from October to April 2002-2003 and 2003-2004. A census of the birds was taken every fortnight. The total number of individuals of different species counted in single field through the telescope were recorded separately and later pooled together to obtain an overall estimate of species present in each month. Species diversity index and dominance index were obtained following Shannon Weiners' Diversity Index and Simpson's Dominance Index respectively.

During the study we recorded 27 species of waterbirds belonging to seven families, of which eight (29.63%) were migrants, 11 (40.74%) local migrants and eight (29.63%) resident (Table 1). The most abundant species was Lesser Whistling-Duck *Dendrocygna javanica* comprising 83.6-95.4% of total waterbirds counted, followed by Gadwall *Anas strepera* (5.3-8.4%), Northern Pintail *Anas acuta* (1.5-6.0%), Garganey *Anas querquedula* (0.6-3.9%), Cotton Teal *Nettapus coromandelianus* (0.3-1.5%) and Northern Shoveller *Anas clypeata* (0.1-0.8%), while others were present in less significant numbers.

Lesser Whistling-Duck and Gadwall were the first migrants to arrive, during last quarter of October when average temperatures ranged from 18.3°C (Min.)-

30.2°C (Max.). Their numbers peaked during December-January when average temperatures were 14.4°C (Min.) and 27°C (Max.). Their numbers gradually dwindled as summer proceeded (Table 1 and Fig. 1). They were followed by Northern Pintail and Garganey in the second quarter of November. Northern Shoveller *Anas clypeata* and Cotton Teal were recorded in significant numbers from the first quarter of December. The total population of the migratory waterfowl peaked during the last quarter of December and first quarter of January, with a dominance index of 0.81217 and 0.76827 respectively (Table 1 and Fig 2). In communities where one or two species contribute quite highly the dominance index is quite high showing values more than 0.5. In our study indeed Lesser Whistling-Duck shows maximum dominance among migratory waterfowl community in the pond. The birds began departing from the last week of January, when Lesser Whistling-Ducks left in large numbers and later, from the middle of February, Gadwall, Northern Pintail and Cotton Teal began to leave. In the first week of April only small flocks of Lesser Whistling-Duck, Garganey and Large Whistling-Duck *Dendrocygna bicolor* were left.

Lesser Whistling-Duck was the most abundant species and was evenly distributed over the entire jheel. During the day a considerable number of birds roosted on the islands. In the morning, most of the waterbirds swam about in small flocks, all over the pond. While they fed, there seemed to be a pattern of aggregation perhaps to avoid overcrowding and inter-specific competition. Gadwall were found near the northern bank, Northern Shoveller and Northern Pintail in the northwest of the jheel while Garganey and Cotton Teal concentrated at the southern end of the jheel. The eastern side of the jheel was completely covered by floating and emergent macrophytes and hence devoid of bird life. Diving ducks like Tufted Pochard *Aythya fuligula* and Ferruginous Pochard *Aythya nyroca* were generally found at the middle of the pond in deeper water. As the day progressed (12:00-

14:30hrs) most of the birds congregated on the islands. From 15:00-16:00hrs all the species of birds became restless, started swimming and were distributed randomly throughout the jheel and made short flights in small flocks over the water. Finally, at about 17:30hrs the first group of birds left the jheel and flew to a nearby paddy field for foraging. At the onset of twilight the entire jheel was almost empty except for a few Gadwall, Northern Shoveller, and Cotton Teal.

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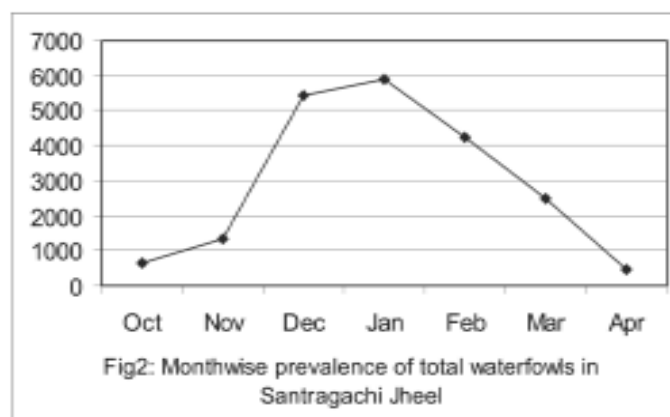
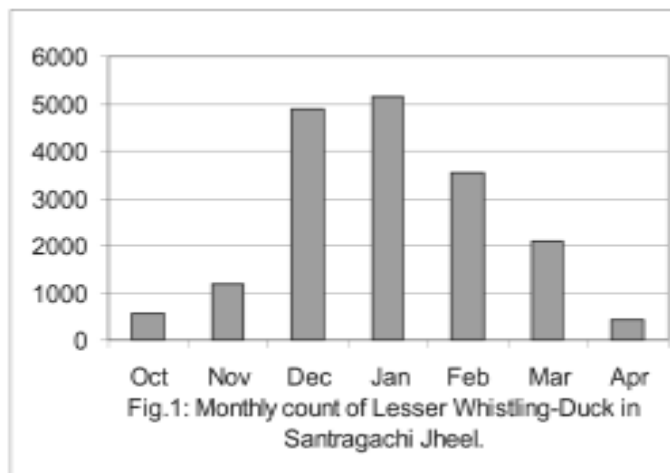
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List of waterbirds observed at Santragachi Jheel during winter season (Oct-Apr 2002-2003 and 2003-2004)

1. Great Cormorant *Phalacrocorax carbo* LM
2. Little Cormorant *Phalacrocorax niger* R
3. Indian Shag *Phalacrocorax fuscicollis* LM
4. Purple Heron *Ardea purpurea* LM
5. Indian Pond-Heron *Ardeola grayii* R
6. Median Egret *Mesophoyx intermedia* LM

7. Yellow Bittern *Ixobrychus sinensis* R
8. Chestnut Bittern *Ixobrychus cinnamomeus* LM
9. Lesser Whistling-Duck *Dendrocygna javanica* LM
10. Large Whistling-Duck *Dendrocygna bicolor* LM
11. Northern Pintail *Anas acuta* M
12. Gadwall *Anas strepera* M
13. Northern Shoveller *Anas clypeata* M
14. Comb Duck *Sarkidiornis melanotos* LM
15. Garganey *Anas querquedula* M
16. Ferruginous Pochard *Aythya nyroca* M
17. Tufted Pochard *Aythya fuligula* M
18. Cotton Teal *Nettapus coromandelianus* LM
19. White-breasted Waterhen *Amaurornis phoenicurus* R
20. Common Moorhen *Gallinula chloropus* LM
21. Bronze-winged Jacana *Metopidius indicus* R
22. Common Snipe *Gallinago gallinago* LM
23. Swinhoe's Snipe *Gallinago megala* M
24. Pintail Snipe *Gallinago stenura* M
25. Common Kingfisher *Alcedo atthis* R
26. White throated Kingfisher *Halcyon smyrnensis* R
27. Stork-billed Kingfisher *Halcyon capensis* R



Legend: LM=Local migrant; M=Migrant; R=Resident.

Species	Oct		Nov		Dec		Jan		Feb		Mar		Apr	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lesser Whistling-Duck	566	91	1177	88.6	4893	89.9	5159	87.3	3543	83.6	2091	84.0	418	95.4
Gadwall	49	7.9	111	8.4	287	5.3	324	5.5	295	7.0	152	6.1	0	-
Northern Pintail	0	-	20	1.5	184	3.4	272	4.6	256	6.0	143	5.8	0	-
Garganey	5	0.8	12	0.9	32	0.6	38	0.6	41	1.0	36	1.5	17	3.9
Northern Shoveller	0	-	1	0.1	26	0.5	48	0.8	43	1.0	20	0.8	0	-
Cotton Teal	2	0.3	4	0.3	15	0.3	47	0.8	47	1.1	36	1.5	0	-
Large Whistling-Duck	0	-	2	0.15	4	0.07	8	0.14	4	0.09	3	0.12	3	0.69
Tufted Pochard	0	-	0	-	2	0.04	5	0.09	3	0.07	4	0.16	0	-
Ferruginous Pochard	0	-	1	0.08	2	0.04	5	0.09	3	0.07	3	0.12	0	-
Comb Duck	0	-	0	-	0	-	1	0.02	1	0.02	0	-	0	-
<b>Total Count</b>	<b>622</b>		<b>1328</b>		<b>5445</b>		<b>5907</b>		<b>4236</b>		<b>2488</b>		<b>438</b>	
Diversity Index	0.14903		0.19917		0.19557		0.23998		0.28874		0.290554		0.088959	
Dominance Index	0.83407		0.79329		0.81217		0.76827		0.70839		0.71379		0.91236	
Min. Temp. (in °C)	18.3		18.0		16.2		14.4		18.2		18.8		25.4	
Max. Temp. (in °C)	30.2		30.0		28.5		27.0		30.7		33.3		37.1	