

Impact of abnormal morphology of breeding in oriental white Ibis, *Threskiornis melanocephalus*

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ABSTRACT

Oriental White Ibis, also known as Indian White Ibis (*Threskiornis melanocephalus*), belongs to family Threskiornithidae. It is a large, white-water bird with a prominent bare black head and neck, and a long, down-curved black bill. The body of this species is elongated but robust. The tail of the black-headed ibis bears grey ornamental feathers. Both the male and female black-headed ibis are similar in size and appearance. We observed many leucistic Black-headed Ibis during breeding season. Almost partially leucistic individuals (15) were solitary and perched on nesting trees but few birds (only one) form pairs with normal individuals of Black-headed Ibis at the end of breeding season. The comparison of various behaviors like nest building, courtship and mating, incubation, hatching and feeding of such abnormal and normal morphs, were studied June 2019 to October 2020, factors affecting the breeding success of the species were also analyzed. The abnormal morphology failed to form a pair like normal morphs during breeding cycle.

Figures : 21

References : 10

Tables : 02

KEY WORDS : Abnormal morph, Behavioural patterns, Black-Headed Ibis, Water bird

Introduction

Indian White Ibis (*Threskiornis melanocephalus*), a near threatened (IUCN3.1) species of wading bird of the family Threskiornithidae, breeds in the Indian Subcontinent and Southeast Asia. It is a nomadic, Pelecaniformes water bird that gregariously breed at shallow wetland habitats in India. Distribution of all the species of the family is noticeable in Rajasthan. It is a colonial breeder. Its breeding season is June to October in North India. The nest of Oriental White Ibis is a platform of twigs and sticks built on emergent shrubs and moderate to tall-sized trees like *Prosopis*, *Acacia*, *Ziziphus*, *Salvadora* and various species of *Ficus*, which stand in or near water^{1,7}. Knowledge of the arrival dates and breeding dates of bird are important for studying long term trends of changes in timing of breeding in the ongoing climate changes. Therefore, such information could be used as an indicator tool and impact assessment of the system. The species is suspected to be in moderately rapid decline owing to hunting, egg collecting, disturbance at breeding colonies, drainage

and agricultural conversion.

Normal morphology : Black-Headed Ibis is a large, white-water bird with a prominent bare black head and neck, and a long, down-curved black bill. The body of this species is elongated but robust. The tail of the black-headed ibis bears grey ornamental feathers, both the male and female black-headed ibis are similar in size and appearance (Fig.1). Bare patches under the wings turn into blood red color in breeding season. **Abnormal morphology**: The colour abnormality in birds (Scarlet Ibis *Eudocimus ruber*) is a common phenomenon^{6,10}. Partial albinism in left wing primaries, secondaries and underwing coverts also reported in Glossy Ibis *Plegadis falcinellus*⁹. A partial leucistic subadult of Black-headed Ibis (*Threskiornis melanocephalus*) has black coloured legs and bill but whitish head and upper part of the throat; pure white coloured nape, greyish areas around the eyes and front of neck were also reported^{5,8}. We observed sixteen leucistic adults of Black-headed Ibis (BHI) during breeding seasons. (Figs. 2 to 16)

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TABLE-1 : Breeding status of normal morphs and Abnormal morphs in 2019

Sr.	PARA-METERS	NORMAL MORPHS												ABNORMAL MORPHS									
		BREEDING SITES (3)																	BREEDING SITE				
		Nehru Talai, Bhilwara					Pur Village				Bareilly pond, Hurda		Nehru Talai, Bhilwara										
		1 July	1 Aug.	1 Sep.	1 Oct.	1 Nov.	1 Sep.	1 Oct.	1 Nov	1 Oct.	1 Nov	1 July.	1 Aug.	1 Sep.	1 Oct.	1 Nov							
1.	No. of BHI	120	155	226	22	31	17	15	04	12	11	5	7	2	-	-							
2.	Number of breeding pairs	88	136	222	06	02	32	30	00	11	12	-	-	01	-	-							
3.	Number of nests	44	68	111	03	01	16	30	00	11	12	-	-	-	01	-							
4.	Number of eggs	59	64	251	07	00	08	12	00	24	00	-	-	-	02	-							
5.	Number of hatchlings	00	99	08	00	03	06	08	00	05	00	-	-	-	02	-							
6.	Number of nestlings	00	04	82	204	00	32	39	00	04	26	-	-	-	-	02							
7.	Number of fledglings	00	00	103	263	158	02	93	79	00	07	-	-	-	-	02							
8.	Total number of off-springs			423				139		34				02									

TABLE-2. Breeding status of Normal morphs and Abnormal morphs in 2020

Sr.	PARA-METERS	NORMAL MORPHS												ABNORMAL MORPHS	
		BREEDING SITES (4)													
		Nehru Talai, Bhilwara						Pur Village							
		7 June	1 July	1 Aug.	1 Sep.	1 Oct.	8 June	1 Aug.	10 Aug.	17 Aug.	1 Sep.	1 Oct.	Bareli pond, Hurda	Potlan village pond	
1.	No. of BHI	41	60	318	53	11	1	04	14	14	12	02	12	16 Oct.	3 Aug.
2.	Number of breeding pairs	40	170	204	42	28	-	06	28	28	36	40	24	14	-
3.	Number of nests	20	85	102	21	14	-	03	14	14	18	20	12	07	-
4.	Number of eggs	25	97	22	25	-	-	-	-	12	28	02	26	-	-
5.	Number of hatchlings	-	01	15	17	-	-	-	-	08	-	-	-	-	-
6.	Number of nestlings	-	-	35	07	12	-	-	-	03	02	-	-	-	-
7.	Number of fledglings	-	-	94	151	07	-	-	-	05	02	15	-	13	-
8.	Total number of off-springs			264				22			26		13		-



Fig.1 : Black-headed Ibis - Normal morph

Materials and Methods

We observed the breeding of abnormal morphs as well as normal morphs of Black-headed Ibis at Nehru Talai (Dhandolai) for two years (June 2019 to November 2019 & June 2020 to October 2020). For the study of nest and nest contents, direct observation method was applied. The behavioral aspects were recorded from placing a camera on a tripod at different times of the day to cover various activities like total number of adults, total number of breeding pairs and number of nests, total number of eggs, total number of hatchlings & nestlings & fledglings *etc.* We followed the guidelines for conducting research on the nesting biology of birds. Visits were in the late mornings and afternoons, and as we were studying heronry birds, we had all the necessary monitoring equipment always in hand. Visits were made once in 3–4 days to minimize impact. While we measured and estimated, some of the nest parameters, like tree species, height of the nest from ground, GPS location, distance between nests, distance from tree axis, or distance from nests of other heronry birds, a nest's physical parameters like nest size, cup diameter, cup depth, or nesting materials were documented after the nestlings had fledged out. Hence, every care was taken to ensure that the breeding birds were not disturbed.

Observation

For the study of breeding biology of Black-headed Ibis, four different breeding sites in Bhilwara district (Fig. 17) were selected.

1. Nehru talai, Bhilwara (25°21.26"N & 74°38.19"E)
2. Pur village pond (25°17.581"N & 74°32.031"E)

3. Bareli pond, Hurda village (25°53.938"N & 74°41.093"E)
4. Potlan village pond (25°07.842"N & 74°12.887"E)

In 2019, We have seen three breeding sites of Black-headed Ibis in Bhilwara district (Table-1) and in 2020, We have seen four breeding sites of Black-headed Ibis in Bhilwara district (Table-2), out of which breeding of abnormal morph was seen only at Nehru Talai (25°21.26"N & 74°38.19"E).

We regularly visited Nehru talai (Bhilwara) for observation of the breeding of Black-headed Ibis. Breeding of Black-headed Ibis generally occurs from June to October but during this time abnormal morphs could not make such a pair. Almost partially leucistic individuals were solitary and perched on nesting trees but only one female bird form a pair with normal male of Black-headed Ibis (Table-1) at the end of breeding season (September to November). The comparison of various behaviours like nest building, courtship and mating, incubation, hatching and feeding of such abnormal and normal Black-headed Ibis, were studied in two breeding seasons (June 2019 to November 2019 & June 2020 to October 2020) (Table-2).

Results and Discussion

When we compare the abnormal morph with the normal morph the result clearly indicates that abnormal morph failed to form a pair like normal morph during breeding cycle due to its abnormal structure. Delayed pairing was observed in only one abnormal morph out of sixteen abnormal morphs (Fig. 18 and 21). Two eggs were layed by this female which formed pair with normal
















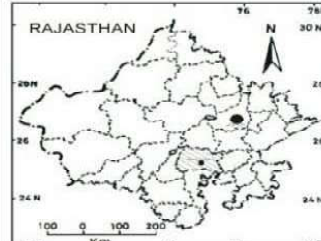
			
<p>Fig. 2 : Cover of white feathers on head and neck.</p>	<p>Fig. 3 : Head and neck are completely white.</p>	<p>Fig. 4 : Neck is white.</p>	<p>Fig. 5 : Neck is white.</p>
			
<p>Fig.6 : White feathers on certain part of the neck.</p>	<p>Fig. 7 : White feathers on certain part of the neck.</p>	<p>Fig. 8 : White feathers on certain part of the neck.</p>	<p>Fig. 9 : White feathers on certain part of the neck.</p>
			
<p>Fig.10 : Whitish neck</p>	<p>Fig. 11 : White scattered feathers on the neck and legs.</p>	<p>Fig. 12 : Whitish neck</p>	<p>Fig. 13 : Whitish neck</p>
			
<p>Fig.14 : White feathers on certain part of the neck.</p>	<p>Fig. 15 : White feathers on certain part of the neck and light colored beak.</p>	<p>Fig.16 : White feathers on certain part of the neck.</p>	<p>Fig.17 : Bhilwara district of Rajasthan</p>

Fig. 2 to 16 : Abnormal morphs (Adults)



Fig. 18 White feathers scattered on the neck.



Fig.19 & 20 Feeding to fledgling by adult abnormal morph

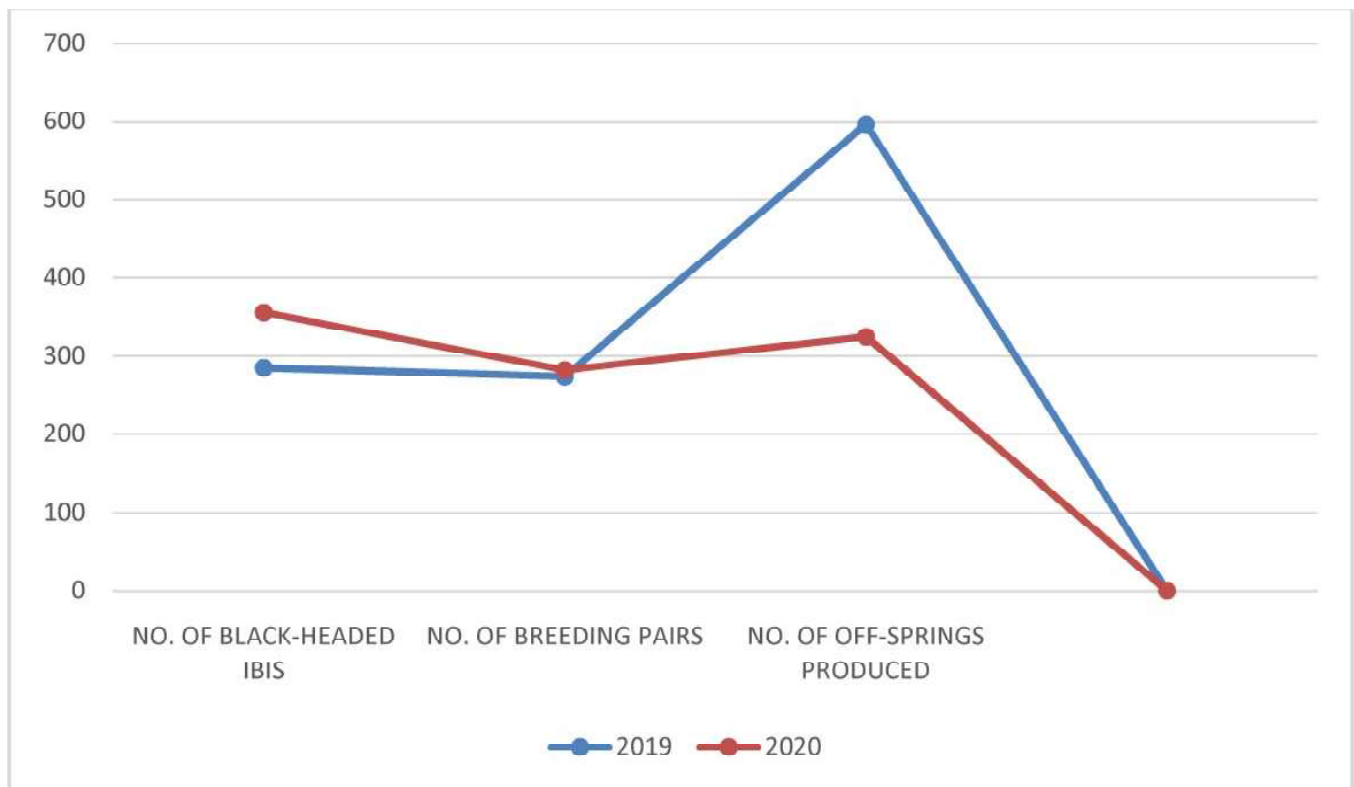


Fig. 21 Breeding success of normal morphs of BHI in Bhilwara district of Rajasthan

morph. Two off-springs (Figs. 19, 20) were developed in due course of time.

Conclusion

Further genetical analysis suggested for **DNA BARCODING METHOD** which can detect genetical

changes between normal and abnormal morphs. A little work has been done, earlier on the impact of morphology on the abnormal morph pairing. These kinds of abnormal morphs are formed due to abnormal embryonic development.

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