

**Full Length Research Paper****Some Breeding Parameters in a Colony of Indian Pond Herons (*Ardea grayii*)****Mustahson Farooq Fazili**

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Abstract

We carried out the present study in Anchar Lake, Kashmir for a period of three years (2006 to 2008) and made regular field surveys from April to September each year to observe various breeding parameters. We located 153 nests during our study and made observations on 45 nests (15 nests each year). Nesting started in late April and was complete by the end of June with mid-May to mid-June as peak nesting months. Egg laying started in early May and was complete before mid-July. June was the peak egg-laying month. Clutch size varied from two to six, with an average of 3.47 (± 0.98 ; $n=45$). Both sexes incubate the eggs. The incubation period varied from 20 to 24 days. Nest success was 86.67% and hatching success was thus 75.31%. The young ones fledged between 28 to 35 days and made flying attempts after 6th week.

Key words: Pond heron, nesting, egg laying, incubation, nesting success, hatching success, parental care.

Introduction

The northern part of Anchar Lake has been encroached and planted with willows. The smaller willows in the vicinity of water serve as nesting sites for Indian pond heron (*Ardea grayii*) and a large number of birds of this species nest in this area to form a breeding colony. In the present study an attempt was made to study various breeding parameters of the bird in this colony.

Study area

Anchar Lake is situated at a distance of 10 kms in the north-west of Srinagar. In shape it is triangular with its length about 11.2 km and a breadth of 2.7 km. The periphery of the lake is about 15-16 km. The lake is fed by a network of channels from Sindh Nallah on its northern and Khushalsar Lake on its southern side. Average depth of the lake is 1.2 meter. The northern part of the lake is marshy with patches of tall and dense vegetation. The vegetation of the lake is composed of *Scirpus palustris*, *Typha angustata*, *Phragmites communis*, *Sparganium ramosum*, *Carex sp.*, *Cyperus sp.*, *Potamogeton sp.*, *Nymphaea maxicana*, *Nymphoides peltatus* *Trapa natans* etc. The periphery of the lake is surrounded by the dense growth of willows and a large willow plantation exists on its northern periphery.

Methods

We carried out the present study for a period of three years (2006 to 2008) and made regular field surveys from April to September each year to observe various breeding parameters. We surveyed each willow to detect nest building. Indian pond heron builds its nests on the willow trees; so many breeding parameters are not visible from ground. Therefore, we used a wooden ladder of 20ft. to observe the nests. In order to prevent the disturbance to breeding birds, we did not place the ladder against the willows on which nests existed but against those neighbouring trees which did not contain any nests and were at least 4 meters away from the nests. We randomly selected only 15 nests each year for the study of various breeding parameters although the total number of nests recorded during the study period was 153.

During breeding season, we visited each of these nests to determine egg laying intervals, incubation behavior, nest success, hatching success and breeding success.

$$\text{Nest success} = \frac{\text{Number of successful nests}}{\text{Number of nests studied}} \times 100$$

$$\text{Hatching success} = \frac{\text{Number of eggs hatched}}{\text{Number of eggs studied}} \times 100$$

$$\text{Breeding success} = \frac{\text{Number of young fledged}}{\text{Number of eggs studied}} \times 100$$

We located 153 nests (Table 1) during our study and made the following observations on 45 nests (15 nests each year).

Year	No. of nests located	No. of nests studied
2006	56	15
2007	50	15
2008	47	15
Total	153	45

Nesting

Nesting started in late April and was complete by the end of the June with mid-May to mid-June as peak nesting months. Both sexes collect material for the nests but only female builds the nest. The nests are built on the willow trees and each nest is in the form of a simple platform made of small willow sticks. Most of the nesting materials were collected from the vicinity of the nesting sites. The construction of a nest took almost one week.

Egg laying

Egg laying started in early May and was complete before mid-July with the first egg being laid on 12th May in 2006, 8th May in 2007 and 21st May in 2008. The month-wise data on nest initiation (laying of first egg in the nest) is shown in the Table 2.

Month	Year	No. of nests initiated	Total
May	2006	3	9
	2007	4	
	2008	2	
June	2006	7	20
	2007	7	
	2008	6	
July	2006	5	16
	2007	4	
	2008	7	

Egg laying dates were determined for a total of 162 eggs (54 in 2006, 57 in 2007 and 51 in 2008). The month wise data on egg laying for these 162 eggs is shown in the Table 3.

It is evident from the table that June was the peak egg-laying month. Egg laying was completed before mid-July. One egg was laid daily, either during the night or in morning between 0600 and 1100 hours. The bird spent 20–45 minutes on the nest at the time of egg laying. The eggs were small ovals with a light greenish tinge and without any markings (Plate 1).

Month	Year	No. of eggs laid	Total
May	2006	13	38
	2007	17	
	2008	8	
June	2006	25	71
	2007	27	
	2008	19	
July	2006	16	53
	2007	13	
	2008	24	
Total	2006	54	162
	2007	57	
	2008	51	

Clutch size

Clutch sizes varied from two to six, with an average of 3.47 (± 0.98 ; $n=45$). The smallest clutch, comprising two eggs, was found in 5 nests, a clutch size of three was most common found in 22 nests while the largest clutch of six eggs was found in only two nests. (Table 4).

Table 4. Eggs per clutch

Year	Clutch size					Average clutch	Total no. of nests
	2	3	4	5	6		
2006	1	7	5	2	-	3.53(± 0.83)	15
2007	2	6	5	-	2	3.6(± 1.18)	15
2008	2	9	2	2	-	3.27(± 0.88)	15
Total	5	22	12	4	2	3.47 (± 0.98)	45

Incubation

Both sexes incubate the eggs. When one sex leaves the nest the other comes to incubate. Incubation started after the laying of first egg but in few cases it was initiated after the laying of 2nd egg. The eggs were incubated and shaded by adopting a characteristic posture. During heavy rains wings were spread and tightly wrapped over the eggs. Of the 45 nests studied, six nests were predated before hatching and incubation period was thus studied only for 39 nests (Table 5). The incubation period varied from 20 to 24 days. In majority of cases it was completed in 21 – 22 days with an over all average of 21.69(± 1.0).

Table 5. Incubation period of Indian pond heron.

Year	No. clutches observed	No. of incubation days					Mean incubation period \pm S.D
		20	21	22	23	24	
2006	12	1	4	4	2	1	21.83 ± 1.11
2007	15	2	5	6	2	-	21.53 ± 0.92
2008	12	1	4	5	1	1	21.75 ± 1.06
Total	39	4	13	15	5	2	21.69± 1.0

Nest success and hatching success

Hatching was asynchronous. Of the 45 nests studied, six nests were predated before hatching while 39 nests hatched successfully so that the nest success was 86.67%. Of the 162 eggs studied, 29 eggs were predated while 11 eggs failed to hatch probably due to infertility and faulty incubation. The hatching success was thus 75.31% (Table 6). Thus a total of 122 young ones were produced. Only house crow (*Corvus splendens*) was seen to prey upon the nests.

Table 6. Fate of nests and eggs studied

Nests studied	Nest success				Hatching success					
	Nests predated	%	Successful Nests	(%)	Eggs predated	%	Intact eggs not hatched	%	Eggs hatched	%
45	6	13.33	39	86.67	29	17.9	11	6.79	122	75.31

Parental care

The parental care was well marked right from the laying stage. Once the eggs are laid in the colony, the main predator, house crow, becomes attracted to the colony to feed on eggs. As the house crow is an opportunistic feeder, it remains in search of the chance to feed on heron eggs. When the birds are slightly away from the nest, the crow attacks the nest. However, one or the both sexes come to the rescue of their nest and chase away the predator. To avoid the predation of the nest, a bird of the pair or both remains close to the nest for most of the time to protect it. But sometimes the predator succeeds in looting the eggs. After hatching parents bring food for the young and feed them at intervals and guard them against the predator.

Fledging

The chicks were partially precocial, covered thinly with down feathers but with eyes closed. The young ones fledged between 28 to 35 days and made flying attempts after 6th week. Only 96 young fledged and of the rest 17 were predated while the cause of death of nine young was not known. Thus the overall breeding success was 59.26%.



A clutch of Indian pond heron



Newly hatched young of Indian pond heron



Five week old young of pond heron.

Discussion

During our study Indian pond herons began to nest in late April and nest building was complete by the end of the June with mid-May to mid-June as peak nesting months. Bates and Lowther (1952) have also reported May as the nesting month of the bird in Kashmir. Both sexes collect material for the nests but only female builds the nest. This observation is in conformity with Bates and Lowther (1952). However, Hancock and Elliot (1978) reported that the male collected the material and the female built the nest. Ali and Ripley (1983) have described the nest of Pond Heron as an untidy structure of twigs while Henry (1971) reported the nest as flat platform and devoid of inner lining. Taylor (1933) reported the nest of Chinese pond heron (*Ardeola bacchus*) as a scanty structure of twigs in tops of high trees.

Egg laying started in early May. June was the peak egg-laying month. Egg laying was completed before mid-July. Bates and Lowther (1952) reported egg laying to start in mid-May through whole of June till 7th of July.

During the present study an average clutch size was 3.47 (± 0.98). The clutch size reported by various workers are 3 to five (Ali and Ripley, 1983), 1 to 4 (Yesmin et al. 2001) and 4 to 6 (Bates and Lowther, 1952). Taylor (1933) reported a clutch size of 3 to 6 pale greenish-blue eggs in Chinese pond heron. Pratt (1974) reported a Clutch size of 2-5 with a mean of 3-3.6 in Great Blue Herons at Audubon Canyon Ranch, California.

Both sexes incubate the eggs. Incubation started after the laying of first egg but in few cases it was initiated after the laying of 2nd egg. Bates and Lowther (1952) also reported incubation by both sexes. The incubation period varied from 20 to 24 days with an average of 21.69(± 1.0) days. Yesmin et al. (2001) reported the average incubation period to be 23.02 days. The hatching success was thus 75.31% while overall breeding success was 59.26%. Yesmin et al. (2001) reported a hatching success of 46.05%. Pratt (1974) reported that Great Blue Herons produced 1.7 young per breeding pair in 1972 and 1.5 in 1973. Number fledged per successful nest was 2-2.2.

References

- Ali, S and Ripley, S.D. (1983). Handbook of the birds of India and Pakistan. Compact edition. *Oxford Univ Press*. Delhi.
- Ali, S. (2002). The Book of Indian Birds. *Oxford Univ. Press*, Bombay.
- Bates, R. S. P. & Lowther, E. H. N. 1952. *Breeding birds of Kashmir*. London: Oxford University Press.
- Hancock, J. and Elliot, H. 1978. The Herons of the World. London Editions Ltd.,
- Henry, G.M. 1971. A guide to the birds of Ceylon. Oxford University Press. London.
- Pratt. H.M. 1974. Breeding of great blue herons and great egrets at Audubon canyon ranch, California. *Western Birds* 5: 127-136.
- Taylor, M. 1933. Nests and Eggs of Hong Kong Birds. *The Hong Kong Naturalist*. 4(1): 2-10.
- Yesmin, R., Rahman, K. and Haque, N. (2001) The breeding biology of the Pond Heron (*Ardeola grayii* Sykes) in captivity. *Tigerpaper* 28 (1): 15-18.