

Egg laying, egg parameters and clutch size in Mallard *Anas platyrhynchos*

G. Mustafa Shah, Ulfat Jan, Fayaz Ahmad Ahanger, Bilal A. Bhat & M. F. Fazili

Shah, G. M., Jan, U., Ahanger, F. A., Bhat, B. A. & Fazili, M. F. 2009. Egg laying, egg parameters and clutch size in Mallard *Anas platyrhynchos*. *Indian Birds* 4 (3): 106–108 (2008).

G. Mustafa Shah, Ulfat Jan, Fayaz Ahmad Ahanger, Bilal A. Bhat & M. F. Fazili: Post Graduate Department of Zoology, University of Kashmir, Srinagar 190006, Jammu & Kashmir, India. Email: fayaz_sultan@yahoo.co.in

Ms received on 28th June 2007.

Abstract

This paper discusses observations made on egg laying, egg parameters and clutch size in Mallard *Anas platyrhynchos*. Egg laying season extended from early March to early June. April was the peak-laying month. Mean egg weight was 50.21 gm (± 2.74) while as the average egg size was 56.42 x 40.55 mm (± 2.34 x ± 1.19). Average clutch size was found to be 8.27 (± 2.23).

Introduction

Within Indian limits, Kashmir is the only state where the Mallard *Anas platyrhynchos* breeds (Bates & Lowther 1952).

Due to the destruction of wetland habitat in general and nesting sites of the bird in particular, unrestricted poaching, illegal egg collection and other human threats, the Mallard gradually stopped breeding in Kashmir. Bates & Lowther (1952), even after extensive surveys, could locate only a few nests in Kashmir. Shah (1984) could not find any evidence of breeding Mallards in the wetlands of Kashmir.

However, since a few years there is a marked change in the attitude of people towards wetlands. More protection is being provided to the wetlands, there is a great reduction in macrophyte harvesting, and a complete ban on duck shooting licenses have all contributed to the Mallard breeding in small numbers, once again, on the wetlands of Kashmir.

Studies on various aspects of the breeding biology of the Mallard were carried out during January 2004–December 2005, at Hokarsar Lake, Jammu & Kashmir. The present paper discusses observations on egg laying, various egg parameters and clutch size of Mallard.

Study area

Hokarsar Lake (34°06'N 74°05'E; 1,584 m a.s.l.) is an Important Bird Area (Islam & Rahmani 2004) in Budgam and Srinagar districts of Jammu & Kashmir. It lies c. 10 kms west of Srinagar on Srinagar–Baramullah highway. The lake is more or less semicircular in outline, extending in an east–west direction with an area of about 13.75 km². It is fed by the Doodhganga, a perennial stream that originates from Doodhganga watershed in Pir Panjal range of Himalayas and Sukhang, a stream on its west. Hokarsar drains into River Jhelum on the north-west through a small stream near Sozayet. The wetland provides an excellent habitat to a variety of resident and non-resident birds and is renowned for its wintering waterfowl (Islam & Rahmani 2004).

Methodology

Mallards nest in tall, dense macrophytic vegetation, willow *Salix*

spp. bushes and hollows of old willows. During the breeding season, such vegetation was thoroughly searched to detect nests. We flushed ducks by gently disturbing the macrophytic vegetation and willow bushes (Klett *et al.* 1988). Care was taken to avoid excessive disturbance, which might have attracted predators. Care was also taken to avoid stepping upon the well-concealed nests. Slender willow stakes flagged with strips of cloth were planted at a distance of at least 4 m from each nest to mark its position for easy location (Klett *et al.* 1988). During egg laying season, each nest was visited daily to determine egg laying intervals. Each newly laid egg was measured with Vernier calipers and weighed to nearest gram.

Results

We located 41 nests during our study and made the following observations.

Egg laying

The Mallard was found to be an early breeder. Egg laying started in early March and was complete by early June.

In 2004, 19 nests were studied, and initiation dates (date on which first egg was laid) determined for 12. Egg laying started in early March, with the first egg being laid on 4th March 2004.

In 2005, 22 nests were studied and initiation dates were determined for 19. The latter half of February saw heavy snowfall in the valley, resulted in a considerable drop in

Table 1. Month-wise data on nest initiation

Month	Year	No. of nests initiated	Total
March	2004	04	07
	2005	03	
April	2004	03	11
	2005	08	
May	2004	04	11
	2005	07	
June	2004	01	02
	2005	01	
Total	2004	12	31
	2005	19	

Table 2. Month-wise egg laying

Month	Year	No. of eggs laid	Total
March	2004	24	48
	2005	24	
April	2004	41	116
	2005	75	
May	2004	34	81
	2005	47	
June	2004	04	11
	2005	07	
Total	2004	103	256
	2005	153	

Table 3. Egg parameters

Egg parameter	Minimum value	Maximum value	Mean value	Number measured (n)
Weight				
(Un-incubated) (gm)	41.0	55.5	50.21 (± 2.74)	40
Length (mm)	52.0	60.0	56.42 (± 2.34)	40
Breadth (mm)	37.4	42.2	40.55 (± 1.19)	40

temperature, which delayed the laying till late March. In the earliest nest found during the season egg laying was initiated on 20th March.

The month-wise data on nest initiation are shown in the Table 1.

Egg laying dates were determined for a total of 256 eggs (103 in 2004 and 153 in 2005). The month wise data on egg laying for these 256 eggs are shown in the Table 2.

It is evident from the table that April was the peak egg-laying month. Egg laying was completed in early June.

One egg was laid every morning between 0500 and 1100 hrs, till the completion of a full clutch. The duck spent 17–63 min on the nest at the time of egg laying.

Egg parameters

Eggs were elliptical ovate in shape with one end relatively broad and the other more or less pointed. Their colour varied from creamy to greyish or greenish buff without any markings. The sizes and weights of the eggs are given in Table 3.

Clutch size

Of the 41 nests studied, 37 contained full clutches. Clutch sizes varied from four to 13, with an average of 8.27 (± 2.23 ; $n=37$). The smallest clutch, comprising four eggs, was found in two nests while one nest held a clutch of 13 eggs. A clutch of nine eggs was most common, present in eight nests (Table 4).

Laying dates were determined for 30 full clutches. The average clutch size varied at various periods of the laying season. Early clutches were larger than those deposited late in the season (Table 5).

Discussion

During our study Mallards began laying eggs in the first half of March in 2004 and in the second half of March in 2005—the

Table 5.

Laying period	Average clutch size (SD)	No. of nests
4th March–20th April	9.19 (± 1.64)	16
20th April–22nd May	6.83 (± 1.99)	12
22nd May–10th June	5.5 (± 2.12)	2

delay in the second season presumably caused by a fall in temperature. Hill (1984) also found (in the UK) that Mallards nested earlier in years with high mean February temperatures. Egg laying lasted from early March to early June with April being the peak laying month. Bates & Lowther (1952) presumed late April, May and possibly early June as the laying months in Kashmir while Ali (2002) reported May–June to be the laying months in Kashmir.

The duck laid one egg daily, between 0500 and 1100 hrs, until the completion of a clutch. These observations are in confirmation with Drilling *et al.* (2002).

Several studies (Kluijver 1951; Willson 1966; Crawford 1980) have correlated variations in clutch size with several environmental and physiological factors. During the present study an average clutch size was 8.27 (± 2.23). We found that early clutches, laid at the beginning of a nesting season, were larger; as the season progressed, smaller clutches were found in nests. Hill (1984) also found that late breeding Mallards and Tufted Ducks *Aythya fuligula* laid smaller clutches than those breeding early in a season. Gec (1983) reported Mallards laying four–ten eggs with a maximum of 13 and a mean clutch size of 7.34 (± 2.48).

A clutch of more than 13 eggs is assumed the result of egg dumping (Pehrsson 1991). However in the present study no nest was found to contain more than 13 eggs. Clutch size is influenced by nest initiation date, quality of available diet and the duck's condition (Batt & Prince 1979; Eldridge & Krapu 1988).

Diet too has an impact on clutch size. In captive wild type sibling pairs, siblings fed enriched diet had higher clutch size, larger eggs, faster laying rate and more nesting attempts (Eldridge & Krapu 1988).

Egg size is an important parameter. Chicks from large eggs usually survive better than those from small eggs (Parson 1975; Batt & Prince 1979; Krapu 1979). The average egg size during the present study was 56.42 x 40.55 mm (± 2.34 x ± 1.19). Bent (1923) reported egg dimensions from North America as 57.8 x 41.6 mm. Egg size is strongly influenced by habitat condition, food quality, condition of duck, and population density (Eldridge & Krapu 1988; Pehrsson 1991).

The average weight of an egg, during the present study, was 50.21 gm (± 2.74). The weights reported by various workers are more or less the same—52.2 gm (± 0.5) (Hill 1984), 52.2 (± 4.2) (Rhymer 1988), 52.2 gm, with a range of 32.2–66.7 gm (Eldridge & Krapu 1988), 52.5 gm (Pehrsson 1991) and, 49.3 gm (± 3.5) (Lokemoen *et al.* 1990). Birkhead (1985) and Rhymer (1988) observed that variation in egg weight is higher among clutches than within clutches.

Table 4. Eggs per clutch

Number of Nests	Year	Clutch size										Average clutch	Total no. of nests
		4	5	6	7	8	9	10	11	12	13		
Total	2004	1	2	1	-	2	4	2	3	-	1	8.625 (± 2.23)	16
	2005	1	1	2	5	4	4	1	2	1	-	8.00 (± 2.0)	21
		2	3	3	5	6	8	3	5	1	1	8.27 (± 2.23)	37

References

- Ali, S. 2002. *The book of Indian birds*. 13th (Revised) ed. Daniel, J. C. (ed.) Mumbai: Bombay Natural History Society & Oxford University Press.
- Bates, R. S. P. & Lowther, E. H. N. 1952. *Breeding birds of Kashmir*. London: Oxford University Press.
- Batt, B. D. J. & Prince, H. H. 1979. Laying dates, clutch size and egg weights of captive mallards. *Condor* 81: 35-41.
- Bent, A. C. 1926. Life history of North American marsh birds. *Bull. U. S. Nat. Mus.* (121) pp. 343.
- Birkhead, M. 1985. Variation in egg quality and composition in the Mallard *Anas platyrhynchos*. *Ibis* 127: 467-475.
- Crawford R. D. 1980. Effects of age on reproduction in American coots. *Journal of Wildlife Management* 44: 183-189.
- Drilling, N., Titman, R. & McKinney, F. 2002. Mallard (*Anas platyrhynchos*). In: *The birds of North America*, No. 658. (Eds. Poole, A. & Gill, F.). Philadelphia, P.A.: The birds of North America, Inc.
- Eldridge, J. L. & Krapu, G. L. 1988. The influence of diet quality on the clutch size and laying pattern in Mallards. *Auk*. 105: 102-110.
- Gec, D. 1983. Results of a study of the nesting of Mallard (*Anas platyrhynchos* L.) on the territory of Kopa?evski Rit (Marsh) in Baranja. *Larus* 33-35 (1981-1983), 55-68.
- Hill, D. A. 1984. Laying date, clutch size and egg size of the Mallard *Anas Platyrhynchos* and Tufted Duck *Aythya fuligula*. *Ibis* 126 (4): 484-495.
- Islam, Z.-u. & Rahmani, A. R. 2004. *Important Bird Areas in India. Priority sites for conservation*. Mumbai: Indian Bird Conservation Network:



Fig. 1. Mallard nest with eggs



Fig. 2. Mallard duck on its nest

- Bombay Natural History Society and BirdLife International (UK).
- Klett, A., Terry, T., Shaffer, L. & Douglas, H. J. 1988. Duck nest success in the Prairie Pathole region. *Journal of Wildlife Management* 52 (3): 431-440.
- Kluijver, H. N. 1951. The population ecology of the Great Tit. *Parus Major L. Ardea* 39: 1-135.
- Krapu, G. L. 1979. Nutrition of female dabbling ducks during reproduction. In: Bookhout, T. A. (Ed): *Waterfowl and wetlands—an integrated review*. Proc. 1977. Symp. The Wildlife Society Madison.
- Lokemoen, J. T., Johnson, D. H. & Sharp, D. E. 1990. Weight of wild Mallard *Anas platyrhynchos*, Gadwall *A. strepera* and Blue-winged Teal *A. discors* during the breeding season. *Wildfowl* 41: 122-130.
- Parsons, J. 1975. Asynchronous hatching and chick mortality in Herring Gull *Larus argentatus*. *Ibis* 117 (4): 517-520.
- Pehrsson, O. 1991. Egg and clutch size in Mallard as related to food quality. *Canadian J. Zool.* 69: 156-162.
- Rhymer, J. M. 1988. The effect of egg size variability on thermoregulation of Mallard (*Anas Platyrhynchos*) offspring and its implications for survival. *Oecologia* 75: 20-24.
- Shah, G. M. 1984. *Birds of Hokarsar: food, feeding and breeding biology of resident and non-resident birds*. PhD thesis: University of Kashmir.
- Willson, M. F. 1966. Breeding ecology of the Yellow-headed Blackbird. *Ecological Monographs* 36 (1): 51-77.

In memoriam

Dr Ravi Sankaran

1963 – 2009

Director, Salim Ali Center for Ornithology and Natural History
(SACON)