

# Clutch size and Egg characteristics of Spotted Munia, *Lonchurapunctulata* in Jammu region, J&K India

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**ABSTRACT:** The present study on clutch size and egg characteristics of Spotted Munia, *Lonchurapunctulata* was conducted in Jammu region (J&K) from March 2013- December 2014. A total of 24 clutches were studied. The clutch size was recorded to be 5-7 eggs with mean clutch size  $6.25 \pm 0.51$  (6-7 eggs) in station 1,  $6.55 \pm 0.72$  (5-7 eggs) in station 2 and  $5.42 \pm 0.53$  (5-6 eggs) in station 3. Eggs were white and oval in shape. The mean egg length, breadth, egg volume, egg shape index and egg weight with their ranges were found to be  $16.55 \pm 0.97$  mm (13-18 mm),  $11.77 \pm 0.70$  mm (10-13 mm),  $1.16 \pm 0.14$  cm<sup>3</sup> (0.63-1.46 cm<sup>3</sup>),  $71.41 \pm 6.66$  (61.11-92.3) and  $1.13 \pm 0.99$  g (0.70-1.32 g) respectively. A statistically strong positive correlation was recorded between egg breadth and egg volume & egg width and egg shape index whereas a strong but negative correlation was registered between egg length and egg shape index. The correlation between egg length and egg volume and egg volume and egg shape index were also statistically significant. However correlation between egg length and egg width were negatively significant.

**KEYWORDS:** Spotted Munia, *Lonchurapunctulata*, clutch size, egg characteristics.

## I. INTRODUCTION

The Spotted Munia (*Lonchurapunctulata*) is Sparrow-sized Estrilidfinch native to tropical Asia. It is a seasonally breeding, non-migratory bird occurring throughout Indian sub-continent [1]. The species comprises 11 subspecies found in the plains of South Asia including India, Pakistan, Nepal, Bangladesh and Sri Lanka out of which *Lonchurapunctulata punctulata* is found in Jammu region. It feeds mainly upon grass seeds and crop grains which are maximally available from autumn to late spring [1] [2]. It belongs to least concern category of IUCN.

The dimensions of eggs are important life history variables in birds as hatching mass is highly correlated with the egg size for large number of birds species [3],[4],[5][6] and [7]. Egg size varies with laying order, date of laying, and clutch size, [8], [9] and genetic, ontogenetic, and environmental factors, [10]. Earlier not much work has been done on the clutch and egg characteristics of Spotted Munia particularly from Jammu region. In the light of this background, an attempt has been made to gather information on the clutch size and egg characteristics of Spotted Munia in its natural habitat in Jammu region.

## II. STUDY AREA

Study pertaining to the clutch size and egg characteristics of Spotted Munia was carried out in Jammu region. The area selected for study was further categorized into three stations

**Station I- Bishnah:** It is situated between  $32^{\circ}62'N$  latitudes and  $74^{\circ}87' E$  longitudes at a distance of 14 km from Jammu city. It is located at an altitude of 292 km. Predominated native plant species in this study area

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are *Ziziphus mauritiana*, *Ziziphus jujube*, *Acacia nilotica*, *Morus alba*, *Eucalyptus*, citrus plants, *Melia azadirachta*, *Magnifera indica*, *Dalbergia sissoo*, *Ficus religiosa*, *Ficus bengalensis*, etc.

**Station II-R.S.Pura:** It is situated between 32°36'51.52" N latitudes and 74°38'58.15" E longitudes. The main source of water at this station is Ranbir Canal. Most of the area is surrounded by lush green fields of Wheat (*Triticum aestivum*) and Rice (*Oryza sativa*). Dominant vegetation included trees like *Eucalyptus*, *Melia azadirachta*, *Acacia nilotica*, *Eugenia jambolana* (Jamun), *Morus alba*, *Ziziphus mauritiana*. The area was observed to be least disturbed by transportation, thus providing a good habitat for birds.

**Station III-University Campus:** It lies between the latitudes of 32°67' N and the longitudes of 76°50' E with an altitude of 340 msl. It is at a distance of about 2 km from Jammu city. It is situated in the heart of the city and encloses residential quarters, canteens, botanical garden, zoological park, cactus garden and various academic departments. Vegetation is mainly dominated by tree canopy. Besides the scrutinization of the various study sites, empty plots were also examined to assess the insect prey available there.

### III. METHODOLOGY

In order to record the clutch size and egg characteristics of Spotted Munia extensive field visits were carried out in study area during breeding season. Nests were located by observing the behavior of birds carrying nesting material or food to the nests and by searching vegetation as described by [11]. An active nest was confirmed if adult were seen performing breeding activities such as courtship displays, mating, nest building or renovation, incubation, feeding the young near the nest. Observations were made with the help of field binoculars (Bushnell 7x50 U.S.A made) or by direct visual method as required.

Regular inspections were made to nest to determine various egg characteristics like shape, color, length, breadth and weight. Egg length and egg breadth were measured by using Vernier calliper. Egg volume (V) was calculated from length (L) and breadth (B) of each egg, using formula  $V = 0.51 \times L \times B^2$  developed by [12]. Egg shape index (ES) was calculated using formula:  $ES = B \div L \times 100$ . Correlation between dimensions of eggs was analyzed with Pearson's correlation. Statistical analysis was performed using the SPSS 20 statistical package.

### IV. RESULT AND DISCUSSIONS

Breeding season of Spotted Munia was initiated in rainy season from end of June and continued till November. However its peak was observed to be during August and September. A total of 24 nests were located in the three stations during 2013-14. It was observed that the nest of Spotted Munia was globular or dome shaped made of grass blades and leaves with a lateral entrance hole oriented mainly along the most frequent wind direction. The majority of the nests was located on the thorny plants species as well as on ornamental trees and shrubs and were placed on twigs towards the centre covered with thick tree canopy.



Figure 1: Nest of Spotted Munia on *Acacia nilotica*

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### A. CLUTCH SIZE:

A total of 24 clutches of Spotted Munia were observed during present study. The clutch size during this study revealed variations from minimum 5 to maximum 7. Among 24 clutches, there were 5 nests (20.84%) with clutch size 5, 8 nests (33.33%) with clutch size 6 and 11 nests (45.83%) with clutch size 7. Thus nest with clutch of eggs 7 were significantly more common (**Table-1**). In contrast according to [13] and [14] clutch size of Spotted Munia ranged from 4-6 eggs and 4-8 respectively. However, [15] recorded clutch size varies from 4 to 10. Furthermore, the clutch size revealed variation from 6 to 7 with mean  $6.25 \pm 0.51$  in Bishnah station, 5 to 7 with mean  $6.55 \pm 0.72$  in R.S pura station, and 5 to 6 with mean  $5.42 \pm 0.53$  in University Campus (**Table-2**). Earlier [16] during his three years study, recorded mean clutch size was  $5.66 \pm 0.93$  in urban habitat and  $5.40 \pm 0.98$  in forest and no variation in clutch size were recorded by him between the two habitats as well as years. [17] stated that the mean clutch size can vary with food supply, habitat, population density and age of the breeding adults, latitude, longitude, altitude and the other factors.



**Figure 2:** Clutch of 5 eggs



**Figure 3:** Clutch of 6 eggs



**Figure 4:** Clutch of 7 eggs

Clutch size	n	%	Length Mean± SD	Width Mean± SD	Volume Mean± SD	Weight Mean± SD	Shape index Mean± SD
5	5	20.84	16.80±0.96	11.84±0.62	1.20±0.14	1.16±0.08	70.72±5.92
6	8	33.33	16.29±1.03	11.88±0.70	1.17±1.13	1.14±0.09	73.25±7.35
7	11	45.83	16.62±0.90	11.68±0.72	1.27±1.003	1.12±0.11	70.60±6.20

Table 1: Egg dimensions of Spotted Munia according to the clutch sizes during 2013-2014.

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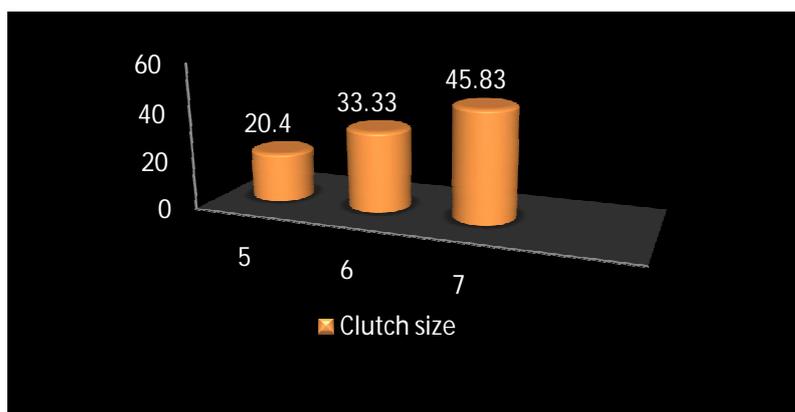


Figure 5: Graph showing frequency of nests of Spotted Munia in study area.

Stations	No. of nests located	Total no. of eggs	Range	Mean Clutch size± S.E	Egg length (mm) Mean± SD	Egg Width (mm) Mean± SD	Egg Volume (cm <sup>3</sup> ) Mean± SD	Egg Shape index Mean± SD	Egg Weight (g) Mean± SD
Station 1	8	53	6-7	6.25±0.51	16.55±0.97	11.77±0.72	1.16±0.13	71.51±7.4	1.14±0.08
Station 2	9	59	6-7	6.55±0.72	16.36±1.00	11.85±0.74	1.17±0.16	72.68±6.18	1.11±0.11
Station 3	7	38	5-6	5.42±0.53	16.84±0.86	11.63±0.59	1.16±0.12	69.30±5.83	1.15±0.09

Table 2: Egg dimensions of Spotted Munia according to Stations

### B. EGG CHARACTERISTICS:

The eggs of Spotted Munia were white and oval in shape with one end larger and the other relatively pointed. The mean egg length was recorded to be (2013-14) 16.55± 0.97mm (minimum 13 and maximum 18), mean egg breadth 11.77±0.70mm (minimum 10 and maximum 13), mean egg volume 1.16±0.14cm<sup>3</sup> (minimum 0.63 and maximum 1.46), mean egg shape index 71.41±6.66 (minimum 61.11 and maximum 92.3) and mean egg weight 1.13±0.99g (minimum 0.70 and maximum 1.32) (table 3).[18]also recorded nearly similar values of mean egg length (16.4mm) and egg breadth (11.6mm) for Spotted Munia. However, for egg volume, shape index and weight no previous information seems too available for comparison for this species.

A very slight difference in egg characteristics was found when we compare nests according to clutch sizes (Table 3).

Parameters	MEAN	SD	Range
Length (mm)	16.55	0.97	13-18
Width (mm)	11.77	0.70	10-13
Volume (cm <sup>3</sup> )	1.16	0.14	0.63-1.46
Shape index	71.41	6.66	61.11-92.3
Weight (g)	1.13	0.99	0.70-1.32

Table 3: Egg dimensions of Spotted Munia during 2013- 2014, n=24 (n= no of clutches)

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## C. STATISTICAL ANALYSIS:

Pearson correlation coefficients (r) between egg variables are show in (table – 4).A strong positive correlation was recorded between egg breadth and egg volume & egg width and egg shape index whereas a strong but negative correlation was registered between egg length and egg shape index. The correlation between egg length and egg volume and egg volume and egg shape index were also statistically significant. However correlation between egg length and egg width were negatively significant.

Variable	Egg breadth	Egg Volume	Shape index
Egg length	-.217** (0.008)	.256** (.002)	-.794** (.000)
Egg breadth	–	.886** (.000)	.762** (.000)
Egg volume	–	–	.379** (.000)

\*\*Correlation is significant at the 0.01 level

Table 4: Pearson’s correlation coefficients (2-tailed) between egg dimensions of the Spotted Munia in Jammu region.

## V. CONCLUSION

From the present study it is clear that in case of Spotted Munia, clutch size varied from station to station. Maximum nest with maximum clutch size were located in Bishnah and R.S pura station. So, it could be ascertain that breeding success of bird require safe nesting sites as well as sufficient quantity and quality of foraging habitat. Hence selection of suitable tree species and nesting site would provide better concealment through greater canopy cover to protect eggs and chicks from predator and rain.Thus conservation efforts need to focus not only on the protection of nesting colonies but also large-scale preservation of adjacent foraging habitat.

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## REFERENCES

1. Ali, S. and Ripley. S. D. "Compact handbook of the birds of India and Pakistan". Oxford Univ. Press, New Delhi, 1987.
2. Bhatt, D, "Cirannual Rhythms in Spotted Munia with special reference to seasonal reproduction." Ph D Thesis, B.H.U. Varanasi, 1982..
3. Coulson, J. C., "Egg size and shape in the Kittiwake and their use in estimating agecomposition of populations." Proc. Zool. Soc. Lond. **140**, 211–227, 1963.
4. Parsons, J., "Relationship between egg size and post-hatching chick mortality in the Herring Gull (*Larus argentatus*).". Nature **228**, 1221–1222, 1970.
5. Howe, H. F., "Egg size hatching asynchrony, sex, and brood reduction in the Common Grackle." Ecology **57**, 1195–1207, 1976.
6. Williams, A. J. & Burger, A. E., 1979 "Aspects of the breeding biology of the Imperial Cormorant, *Phalacrocorax atriceps*, at Marion Island". Gerfaut **69**, 407–423, 1979.
7. Hegyl, Z., "Laying date, egg volumes and chick survival in Lapwing (*Vanellus vanellus*L.), Redshank (*Tringatotanus*L.), and Black-teiled Godwit (*Limosalmos*L.)." Ornis Hungarica **6**, 1–7, 1996.
8. Slagvold, T., Sandvik, J., Rofstad, G., Lorentsen, O and Husby M. "On the adaptive value of intraclutch egg size variation in birds". Auk **101**: 685-695, 1984.
9. Jarvinen A. "Proximate factors affecting egg volume in subarctic hole-nesting passerines." Ornis Fenn. **66**: 99-104, 1991.
10. Potti J. "Environmental, ontogenetic, and genetic variation in egg size of pied flycatchers". Can. J. Zool. **71**:1534-1542, 1993.
11. Martin, T.E. and Geupel, G.R. "Nest- monitoring plots: methods for locating nests and monitoring success." J. Field Ornithol., **64**: 507-519, 1993.
12. Hoyt, D. F., "Practical methods of estimating volume and fresh weight of bird eggs." Auk. **96**:73-77, 1979.
13. Gokula, V and Vijayan, L. "Nest- site characteristics of Spotted Munia(*Lonchurapunctulata*) in Mudumalai Wildlife Sanctuary." South India. J. South Asian Nat. Hist. **5**:187-190, 2001
14. Ali, S. "The book of the Indian birds thirteenth ed. (revised)". J. Bomb. Nat. Hist. Soc., Bombay. p. 286, 2002.
15. Whistler, H., 1949. "Popular handbook of Indian birds". Gurney and Jackson, London Pp.215,1949.
16. Sharma, R.C., Bhatt, D and Sharma, R.K."Breeding success of the tropical Spotted Munia(*Lonchurapunctulata*) in urbanized and forest habitats". Ornithol Sci **3**: 113-117, 2004.
17. Klomp, A. "The determination of clutch size." Ibis, **89**:302-352, 1970.
18. Baker, E. C. S. "The Nidification of Birds of the Indian Empire". Vol.3. Taylor and Francis, London, 1934.