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Egg Weight Loss During Incubation in Three Species of Myna in an Urban Area

KEYWORDS: Egg weight loss of myna.

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ABSTRACT *The average egg weight of 195 eggs was 7.59 g. in Common Myna; in Bank Myna was 6.17g; and in Brahminy Myna was 4.49g. Total weight reduction of 1.92g in Common Myna within three weeks and 1.54g in Bank Myna and 1.02g in Brahminy Myna. The weekly difference in egg weight of Common Myna was found to be 0.42g between first and second week and 1.92g between second and third week. Similarly in Bank Myna, first two weeks difference was 0.68g and last two weeks egg weight loss was 0.86g. In Brahminy Myna egg weight loss of 0.37g between first two weeks, and 0.65g last two weeks.*

INTRODUCTION:

Mynas are one of the common birds through out India (Ali et al. 1983). I have selected three speice of Myna fore the study such as Common Myna (Acridotheres tristis), Bank Myna (Acridotheres ginginianus) and Brahiminy Myna (Sturnus pagodarum). Mynas are classified in order Passeriformes and Family Sturnidae. The eggs of myna are typically, shorter and proportionally broader and different shades of pale sky or greenish blue and are unmarked. Bird eggs are virtually self-contained life-support systems. All they require for the embryo to develop properly are warmth and oxygen. Oxygen diffuses into the egg through microscopic holes formed by the imperfect packing of the calcium carbonate crystals that compose the eggshell. Egg weight loss is an important parameter for incubation. It has been used to estimate vital gas exchange (Paganelli et al., 1978; Rahn et al., 1979), and has been correlated with embryo metabolism and development rates (Rahn & Ar, 1980; Burton & Tullet, 1983).

MATERIAL AND METHOD:

Studies on breeding biology of mynas were conducted in detail at five different study sites. Data were collected and analyzed as per standard methodology available from ornithological studies. Egg weight studies were conducted in the three selected species of mynas, once in a week in all the five study areas. During such visits to the nest, eggs were marked with permanent marker when seen for the first time. On subsequent visits, the fade marks were reinforced to retain the original numbering. A month was divided into four weeks and the exact date of clutch initiation was assigned to a concerned week. Frequency of clutch initiation in different week was made to obtain the peak breeding season. Thus, the date of initiation of clutch helped in determining the breeding schedule. Weight was measured using digital weighting machine (with 500.00g capacity and 2.0g sensitivity) at weekly intervals for each egg.

RESULTS AND DISCUSSION:

The nest is built in roofs of houses, holes of walls, trees, railway station and wells (Dhandhukia et al 2012). Mostly it nests in the habitations of man and their immediate neighborhood. The nest is commonly made up of twigs, grass, straw and feathers and sometimes includes paper (Dhandhukia et al 1914). Incubation period of Common Myna was 13 to 15 days; Bnk Myna was 11 to 13 days and Brahminy Myna was 12 to 15 days respectively. During incubation in many birds eggs (1) some degree of shell thinning occurs, which in some species causes an increase in the water vapour conductance of the eggs shell, and (2) egg temperature, and therefore the water vapour pressure inside the egg, increases. Either one of these factors will result in an increase in the rate of water loss. Thus, an increase in the rate of water loss during incubation is probably a common phenomenon in birds' eggs (David et al.1990).

The average size of 195 eggs was 29.6 X 21.8 mm. Variation in length and breadth was reflected on egg weight which varied from 6.18 to 8.88 g with an average of 7.59 g. in Common Myna; in Bank Myna the average size of 20 eggs was 24.6 X 19.8mm. The variation in length and breadth was also reflected on egg weight which varied from 5.9 to 6.65g with an average of 6.17g. ; And in Brahminy Myna the average size of 26 eggs was 24.0 X 18.3mm. The variation in length and breadth also reflected on egg weight, which varied from 4.27 to 4.74g with an average of 4.49g.

Carbon dioxide and water vapor diffuse outward through the same pores. Birds can lay their eggs in even drier environments than reptiles, because when the fatty yolk is broken down to provide energy for the developing embryo, water is produced as a by-product (Paul et al 1988). Our observation idcate that egg weight was loss during incubation periods. This loss was due to metabolic process during embryonic development that led to the exchange of materials in gaseous forming especially CO_2 and water vapor between the egg and environment through porous egg shell. Eggs of species from wet habitats loose weight at a higher rate than those from drier habitats at a given relative humidity. It is suggested that the conductance of the egg shell to water vapour is adapted to the conditions of humidity in the environment such that weight loss varies little (and less than predictable) in relation to the relative humidity at the nesting sites (Lamholt 1976).

Figure 1 show the egg weight loss measured. Egg weight of the three species of myna were taken on weekly basis and the observations revealed that a total weight reduction of 1.92g in Common Myna within three weeks and 1.54g

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in Bank Myna and 1.02g in Brahminy Myna. Weis J. et al (2011) indicate that high difference in the results recorded for hatchability between medium and large eggs; ducklings from heavier eggs longer to hatch in Muscovy duck. Weight loss during incubation was directly influenced by weight loss during the storage. Eggs stored for longer periods presented lower levels of weight loss during incubation as compared to fresh incubated eggs or those that were submitted to a few days of storage (Romao et al 2008).

The weekly difference in egg weight of Common Myna was found to be 0.42g between first and second week and 1.92g between second and third week. Similarly in Bank Myna, first two weeks difference was 0.68g and last two weeks egg weight loss was 0.86g. In Brahminy Myna egg weight loss of 0.37g between first two weeks, and 0.65g last two weeks. Weight was the fastest growing parameter, which reached approximate to that of adult size in 15 days (Dhandhukia 1914).

Water loss is a normal process during incubation; usually 12 to 14% of water is lost in broilers and turkeys eggs (Rahn et al., 1981). However, too low or too high water loss influences embryo development (Rahn & Ar, 1974), and consequently, egg hatchability (Meir et al., 1984). Incubation temperatures above the optimum cause excessive egg water loss (higher than 14%), leading to embryo mortality by dehydration. On the other hand, temperatures below the optimum decrease hatchability due to reduced water loss (< 12%), which causes an over-hydration of the embryo and an impairment of gas exchange (Romanoff, 1930).

Humidity is one of four primary variables which must be controlled during egg incubation - the others being temperature, ventilation and movement. Egg shells are porous - they allow water to pass through, and so all eggs, whether being incubated or not, dry out slowly. All eggs have an air space at the round end and as water is lost through the shell it is replaced by air drawn through the shell into the air space which gradually increases in size – the greater the water loss through the shell, the larger the airspace. This air space plays a crucial part in incubation. Within it is the first air that the fully developed chick breathes and the space allows the developed chick some movement inside the shell to allow it to manoeuvre into hatching position. If the incubation humidity has been too high the egg will have lost too little moisture and the chick will be rather large. In this case the air space will be too small, the chick's respiration will be affected and the young bird will have difficulty breaking out of the shell because of the lack of space.

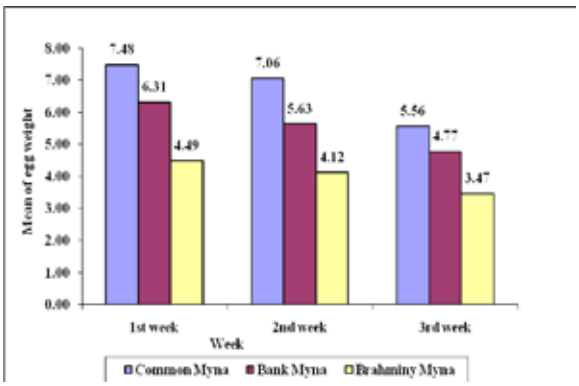

Fig. 1 Egg weight loss in mynas.

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