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Short communication

Egg structural characteristics of Pygmy Cormorant (*Microcarbo pygmaeus*)

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Abstract

This study was carried out to determine egg morphology characteristics and component of Pygmy Cormorant (*Microcarbo pygmaeus*) in Iraq. Freshly Pygmy Cormorant eggs without developed embryo were collected from Al-Tarmiya lakes north of Baghdad city to determined egg morphology characteristics including egg shape dimensions: weight, volume, specific gravity, shell, yolk, albumin weight as well as percentage of shell, yolk and albumin. Results revealed that average values egg breadth, length, shape index, weight, volume, specific gravity, shell weight, yolk weight, albumin weight, egg shell percentage, egg yolk percentage and egg albumin percentage were: 3.11±0.45 (cm), 4.59±0.24 (cm), 67.75±1.07, 12.77±0.55 (gm), 22.64±0.74 (cm^3), 0.56±0.1 (gm/cm^3), 0.87±0.15 (gm), 2.76±0.27 (gm), 9.15±0.59 (gm), 6.80±0.25 (%), 21.58±0.55 (%) and 71.62±2.32 (%) respectively. This report provides important information that can help the avian taxonomists in species classification.

Keywords: Pygmy Cormorant, Egg Morphology, Egg Component

Introduction

Pygmy Cormorant (*Microcarbo pygmaeus*) is a member of the cormorant family of sea birds. It breeds in Southwestern Asia and Southeastern Europe (BirdLife International, 2004). In the past large colonies were present in Mesopotamian marshes of southern Iraq which were destroyed during Gulf War in 1991. These marshes have been restored up to 40% (Kaczmarek et al, 2005). The Pygmy Cormorant breeds now in marshes of south Iraq and wetlands. Pygmy Cormorant is a medium-sized green-glossed black bird having 45–55 cm length and 75–90 cm wingspan. It has a long tail and short thick bill. Adults have small white feather tufts on the head and neck and under parts during breeding season. The sexes are similar, but juveniles are duller and browner. It builds nest of grass and twigs in a low tree or reed bed, into which it lays 3-6 pale blue eggs. The eggs are covered with a thin layer of lime, giving them a matte white coated appearance. They become increasingly stained with feces, as does the nest, over the duration of the breeding season, both parents incubate for 27–30 days, and nestlings become independent after 70 days (Allouse, 1962; BirdLife International, 2004; Moudhafer et al., 2006).

The bird's egg is one of most complex and highly differentiated reproductive germinal cell accumulates relatively enormous amounts of food substances (yolk and albumen material). Bird's egg diverges widely in shape, volume, weight and the amount of yolk and albumen material. The shape of the egg is recognizable species characteristic. Species within a genus lay egg diverge widely from oval to conical shape, with one end rounded and the other more pointed (Stadelman and Cotterill, 1995).

The objective of this study was to determine egg morphology characteristics and component of Pygmy Cormorant (*Microcarbo pygmaeus*) in Iraq.

Materials and Methods

Eight Pygmy Cormorant (*Microcarbo pygmaeus*) freshly laid eggs were collected from different nests (5 nests) without developed embryo from Al-Tarmiya lake north of Baghdad city (Iraq) from January 15th to September 30th of 2011. Egg shape was determined

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according to the description and sketches made by Romanoff and Romanoff (1949). Egg shape index determined using the micrometer according to (Stadelman and Cotterill, 1995) using the following equation:

$$\text{Egg shape index} = \frac{\text{Egg breadth (short circumference) mm}}{\text{Egg length (long circumference) mm}} \times 100$$

Egg weight was determined using a very sensitive digital Sartorius balance (Stadelman and Cotterill, 1995). Egg volume was determined according to the method of Romanoff and Romanoff (1949) as follow:

Egg volume (cm^3) = 0.51 LB2

L: egg length,

B: egg breadth

Egg specific gravity was determined according to Stadelman and Cotterill (1995) using the equation give below:

$$\text{Egg specific gravity } (gm/cm^3) = \frac{\text{Egg weight (gm)}}{\text{Egg volume } (cm^3)}$$

Weights of the egg shell, yolk and albumen materials were determined using a very sensitive digital Sartorius balance after cracking the shell and separating the yolk from albumen materials (Stadelman and Cotterill, 1995). Percentages of egg components (shell, yolk and albumen materials) as a ratio to total egg weight were determined according to (Stadelman and Cotterill (1995), using the equation below:

$$\text{Egg components percentages} = \frac{\text{Component weight (gm)}}{\text{Egg weight (gm)}} \times 100$$

The values were expressed as mean ± standard error.

Results

Mean ± SE of different egg parameters of Pygmy Cormorant are given in Table 1.

Table 1: Egg characteristics of Pygmy Cormorant

Parameters	Mean ± SE
Egg breadth (cm)	3.11 ±0.45
Egg length (cm)	4.59 ±0.24
Egg shape index	67.75 ±1.07
Egg weight (gm)	12.77 ±0.55
Egg volume (cm^3)	22.64 ±0.74
Egg specific gravity (gm/cm^3)	0.56 ±0.10
Egg shell (gm)	0.87 ±0.15
Egg yolk (gm)	2.76 ±0.27
Egg albumin (gm)	9.15 ±0.59
Egg shell (%)	6.80 ±0.25
Egg yolk (%)	21.58 ±0.55
Egg albumin (%)	71.62 ±2.32

Discussion

Eggs of Pygmy Cormorant are just like the other's birds eggs, have an oval shape, with one end rounded and the other pointed. This shape results from the egg being forced through the oviduct. Muscles contract the oviduct behind the egg, pushing it forward (Sturkie, 1986). The egg's wall is still shapeable, and the pointy end develops at the back side. Cliff-nesting birds often have highly conical eggs. They are less likely to roll off, tending instead to roll around in a tight circle, this trait is likely to have arisen due to evolution via natural selection. In contrast, many hole-nesting birds have nearly spherical eggs (Romanoff and Romanoff, 1949).

The egg weight is expressed in terms of size, there is an enormous range in egg size among different species and within the species between individuals. The size of the eggs laid by one individual may differ widely from those laid by another of the same species and breed. Egg size is influenced by climate, the amount of available food, parent's body size, evolutionary status and some other factors (Stadelman and Cotterill, 1995).

Birds are grouped according to the relative amounts of the yolk and albumen, they fall naturally into two classes. Egg in which the yolk constitutes between 15 to 20% of the total weight (lower percentage) belong to the class Altricial species; egg in which the yolk constitutes between 30 to 40 % of the total weight (high percentage) belong to the Precocial species class (Romanoff and Romanoff, 1949).

The yolk has the greatest food values, it contains a mixture of proteins, fats and carbohydrates in a watery medium (Marshall, 1960), the relatively large yolk assures a fairly advanced stage of development in the young at hatching, but in species that lay small-yolked eggs, the young are helpless nesting. In addition, most Altricial birds like Eagle and Dove lay eggs that have relatively thin shells as well as small yolk (Romanoff and Romanoff, 1949).

The present report provides important information that can help the avian taxonomists in species classification.

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