

## Short Communication

# GROSS AND MORPHOMETRICAL STUDIES ON HUMERUS OF CATTLE EGRET (*BUBULCUS IBIS*)

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Received 12 April 2019, revised 10 May 2019

**ABSTRACT:** The present study was conducted on the two humeri bones of cattle egret. The humerus of cattle egret was a long pneumatic bone. The proximal extremity was broad and flattened cranio-caudally and presented head and two tubercles. The head was large ovoid and transversely elongated. Dorsal and ventral tubercles were present. Ventral tubercle was larger than the dorsal one and was separated from the head by a distinct bicipital groove. The pneumatic foramen was located just below the ventral tubercle. The dorsal tubercle continued as a prominent lateral delto-pectoral crest, whereas the bicipital crest originated from the ventral tubercle. The shaft was cylindrical and slightly S-shaped. The distal extremity presented larger ulnar condyle laterally and a smaller radial condyle medially separated by inter-condylar groove. The ulnar epicondyle was larger than the radial one. The caudal surface of distal extremity presented olecranon fossa. The cranial aspect of distal extremity presented brachial fossa. The total length of the bone was 8.85 cm. The maximum width was observed at proximal extremity, which was 1.46 cm, followed by the distal extremity (1.23 cm) and the least value was recorded at the middle of the shaft (0.56 cm). The total length of the delto-pectoral crest was 1.46 cm which was about 16.5 % of the total length of the bone.

**Key words:** Cattle egret, Gross morphometry, Humerus.

The cattle egret (*Bubulcus ibis*) is a cosmopolitan species of heron (Family: Ardeidae) found in the tropics, subtropics, and warm temperate zones (Rezk 2015). It is popular for its role in the bio-control of cattle parasites and land pests. It feeds on insects, moths, spiders, frogs, earth-worms and fishes and is locally distributed in Nile Delta and Valley (AbouShafey 2012). The *Bubulcus* is similar to *Egretta* as the appearance of their plumage looks alike (Hancock 1984) but it is more closely related to the herons of *Ardea* Family (Rezk 2015). Detailed information is available on whole skeleton of fowl (Getty 1975). Some work has been reported on birds like emu (Maxwell and Larsson 2007, Kumar and Singh 2014), long legged buzzard (Atalart *et al.* 2007), Pariah kite (Tiwari *et al.* 2011) and small Indian kite (Sharma and Dubal 2016). But the information on cattle egret is meager which prompted us to undertake the present work on humerus of cattle egret.

### The study

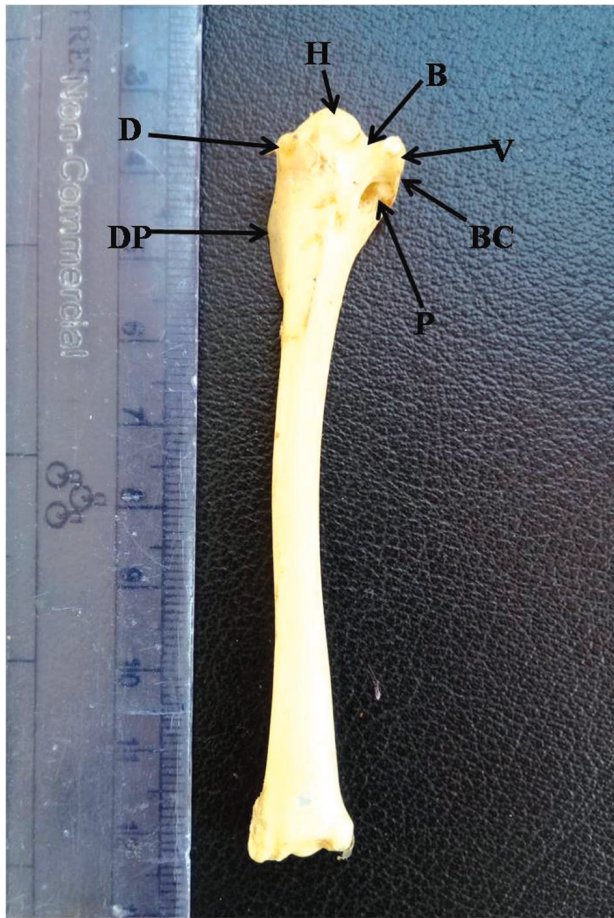
The present study was conducted on the two humeri bones of a cattle egret. The bones were obtained from a dead bird and processed as per standard technique (Raghavan 1964) and subsequently studied to record gross morphological features. Following morphometrical parameters were recorded by using Vernier Calliper, thread and meter scale:

1. Humeral length (cm) was measured from the highest point of the humerus to the lowest point of the humeral condyle.
2. Width (cm) of humerus was taken from three sites: proximal extremity, middle of the shaft and distal extremity.
3. Both transverse and longitudinal diameter (cm) were considered.
4. Distance between dorsal and ventral tubercles (cm).
5. Length of delto-pectoral crest (cm).

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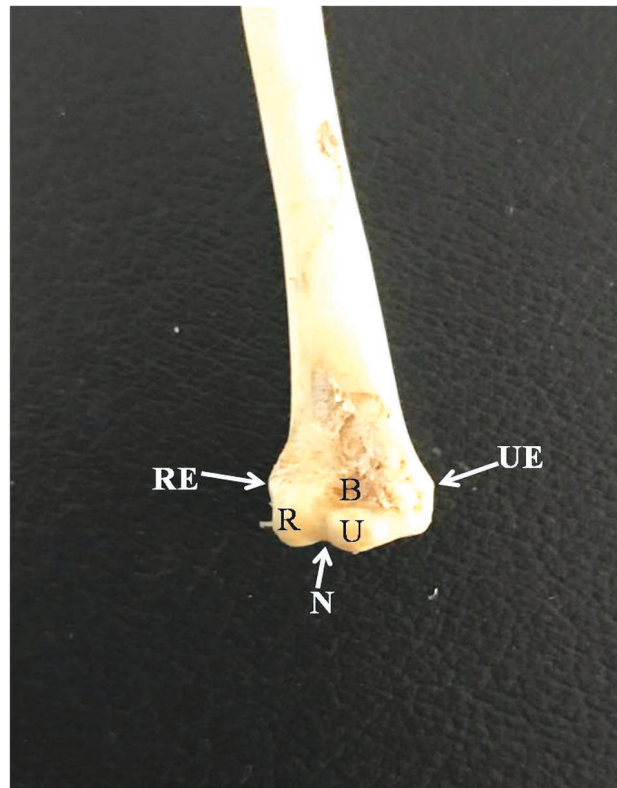


**Fig. 1. Photograph of humerus of Cattle egret showing head (H), ventral tubercle (V), dorsal tubercle (D), bicipital groove (B), pneumatic foramen (P), bicipital crest (BC) and delto-pectoral crest (DP).**

The humerus formed the arm region. It formed ball and socket joint with the glenoid cavity constituted by the scapula and coracoid. Inferiorly, it articulated with the radius and ulna. The humerus of cattle egret was a long pneumatic bone as also observed earlier by Ekeolu *et al.* (2016). It was the strongest wing bone. In small Indian kite too, the humerus was the largest wing bone (Sharma and Dubal 2016). Gross morphologically, it presented two extremities and a shaft. Both the extremities were expanded whereas shaft was cylindrical. The proximal extremity was broad and flattened cranio-caudally as also reported by Getty (1975) in fowl and Sharma and Dubal (2016) in small Indian kite. The proximal extremity presented head and two tubercles (Fig. 1). The head was large ovoid and transversely elongated as also seen in pariah kite (Tiwari *et al.* 2011). In emu, the proximal extremity of humerus lacks a distinct head (Kumar and Singh 2014). Tubercles were two- dorsal and ventral. Ventral tubercle was larger than the dorsal one. It was



**Fig. 2. Photograph of distal extremity of humerus of Cattle egret (caudal aspect) showing shallow olecranon fossa (O) and distinct scapular groove (S).**



**Fig. 3. Photograph of distal extremity of humerus of Cattle egret (cranial aspect) showing ulnar (U) & radial (R) condyles separated by inter-condylar notch (N), ulnar epicondyle (UE), radial epicondyle (RE) and brachial fossa (B).**

separated from the head by a distinct bicipital groove (Fig. 1) as also observed by Atalart *et al.* (2007) in long-legged buzzard.

The ventral tubercle over-hanged the bicipital groove as also observed by Sharma and Dubal (2016) in small Indian kite. The pneumatic foramen was located just below the ventral tubercle (Fig. 1). Atalart *et al.* (2007) also observed a single wide pneumatic foramen in long-legged buzzard. The proximal extremity presented two well developed crests originating from two tubercles. The dorsal tubercle continued as a prominent lateral delto-pectoral crest (Fig. 1), whereas the bicipital crest originated from the ventral tubercle (Fig. 1). The ventral tubercle was larger than the dorsal tubercle but the delto-pectoral crest was more sharp and stronger than the bicipital crest. Similar observations were made by Atalart *et al.* (2007) in long-legged buzzard and Sharma and Dubal (2016) in small Indian Kite. In contrast, the delto-pectoral crest was a ridge-like resembling a faint scar on cranial edge of the dorsal surface of the humerus (Kumar and Singh 2014). Inter-muscular line was present on the caudal surface as also seen in emu (Kumar and Singh 2014). It indicated the ventral extent of deltoideus muscle (Kumar and Singh 2014). The shaft was cylindrical and slightly S-shaped.

The distal extremity presented ulnar condyle laterally and radial condyle medially (Fig. 3) for articulation with ulna and radius, respectively forming the elbow joint. The ulnar condyle was larger than the radial condyle. These two condyles were separated by inter-condylar groove (Fig. 3). The notch was more prominent on cranial aspect. On either side of the condyles, respective epicondyles were present. The ulnar epicondyle was larger than the radial one. The caudal surface of distal extremity presented olecranon fossa (Fig. 2). On its either side two grooves namely scapula-tricipital groove and humeral groove were present.

The scapular groove was preset laterally whereas the humeral groove was located medially and was closer to the olecranon fossa. The scapular groove was more distinct than the humeral groove (Fig. 2). Similar type of morphological arrangement was also observed in small Indian kite (Sharma and Dubal 2016). The cranial aspect of distal extremity presented brachial fossa (Fig. 3).

Few biometrical parameters were also recorded in the present study. The total length of the bone was 8.85 cm. Ekeolu *et al.* (2016) reported the maximum length of right and left humerus of cattle egret to be  $90.78 \pm 0.94$  mm for right humerus and  $90.72 \pm 0.89$  mm for left humerus. Again, the maximum length of humerus of long-legged

buzzard was 10.5 cm (Atalart *et al.* 2007). The width of the bone was taken at three sites. The maximum width was observed at proximal extremity, which was 1.46 cm, followed by the distal extremity (1.23 cm) and the least value was recorded at the middle of the shaft (0.56 cm). From proximal extremity to the middle of the shaft, there was a decline in width of the bone by 61.64 %. Beyond the middle of the shaft, the bone showed an increase in the width towards the distal extremity. The distal extremity was slightly more than the double the width at the middle. Ekeolu *et al.* (2016) measured the diameter of the proximal extremity of humerus in cattle egret at its widest point as  $14.44 \pm 0.26$  mm for right humerus and  $14.06 \pm 0.14$  mm for left humerus. They also measured the diameter at the point from the medial to lateral epicondyles was  $11.78 \pm 0.22$  mm for right humerus and  $12.00 \pm 0.23$  mm for left humerus. Two diameters were also recorded for the head. The largest diameter was 0.96 cm whereas the shortest diameter was 0.53 cm. The distance between the dorsal and the ventral tubercle was 0.86 cm. The total length of the delto-pectoral crest was 1.46 cm which was about 16.5 % of the total length of the bone.

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**Cite this article as:** Sasan J S, Sarma K, Suri S, Nabi N (2019) Gross and morphometrical studies on humerus of cattle egret (*Bubulcus ibis*). ExplorAnim Med Res 9(1): 93-96.