

GROSS ANATOMY OF STERNUM IN WHITE-BREASTED WATERHEN (*AMAURORNIS PHOENICURLUS*)

J. Violet Beulah*¹, P. Sridevi², T.A. Kannan³,
Geetha Ramesh⁴ and S. Ushakumary⁵

Department of Veterinary Anatomy
Madras Veterinary College
Tamil Nadu Veterinary and Animal Sciences University
Chennai- 600 007

ABSTRACT

Gross anatomy of sternum in white-breasted waterhen was studied. Bone samples (sternum) were collected from three carcasses of white-breasted waterhen died were brought for postmortem examination to the Department of Veterinary Pathology, Madras Veterinary College, Chennai. The sternum was quadrilateral in shape. The longitudinal groove on the body of the sternum extended proximally and disappeared distally. The antero-lateral process was large, three-sided polygon shaped. Postero-lateral process was clamp-like at its posterior end. Postero-lateral process extended beyond the level of body of the sternum. Foramen ovale was noticed in the form of a W- shaped oval notch between the body of the sternum and the postero-lateral process. The anterior border of body of the sternum was noticed with two medial pneumatic notches.

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INTRODUCTION

The white-breasted waterhen (*Amaurornis phoenicurlus*) is a water bird of the rail and crake family, Rallidae, that is widely distributed across South and Southeast Asia. Adult white-breasted waterhens have mainly dark grey

upperparts and flanks, and a white face, neck and breast. The lower belly and under tail are cinnamon or white coloured. The sternum was huge, dorsally hollowed and ventrally out curved bony plate, which forms a lower cover to half of the body cavity (Nickle *et al.*, 1977). Sternum in birds is a huge undivided bone with its processes forming a considerable part of ventral body wall and gives attachment to large flight muscle (Dyce *et al.*, 2010). Avian sternum morphology varies considerably in a myriad of traits, including relative size, entire shape, number of trabeculae or fenestrae, and keel height and curvature (Merri *et al.*, 2021)

¹Ph.D Scholar, Corresponding author Email Id: violet.beulahvet@gmail.com

²Ph.D Scholar

³Professor and Head, Education cell

⁴Professor and Head

⁵Professor

sternum also engage in a diverse range of locomotory strategies, with flight styles that include continuous flapping, soaring, and burst flight, and other locomotory modes, such as foot-propelled diving, wing-propelled diving, and running in flightless birds (Taylor *et al.*, 2014).

MATERIALS AND METHODS

Three white-breasted waterhens brought for postmortem examination to the Department of Veterinary Pathology, Madras Veterinary College, Chennai were utilized for the present study. After confirming no skeletal abnormalities present in the carcasses. The sternum were collected and processed to remove the muscles and kept under wet maceration for fifteen days in fresh water to remove the remaining muscle tissue followed by treating it with 10 to 15 % NaHCO₃ (Duzler *et al.*, 2006) to make the bones clean and clear. Morphometry of the sternum was recorded.

RESULTS AND DISCUSSION

Sternum of white-breasted waterhen was slender, big and roughly quadrilateral in shape (Nickle *et al.*, 1977), wide anteriorly and narrow posteriorly as mentioned by (Sunilkumar *et al.*, 2019) in crow. Sternum of the white-breasted waterhen was like a three-sided polygonal shaped structure as it was reported by Pathak *et al.* (2017). The overall length of the sternum was 4.0 cm long and 0.9 cm wide and was very less than the domestic fowl (15 cm long and 3 cm wide) and duck (11 cm long and 4 cm wide) (Sumena and Lucy, 2015). The length of postero-lateral process

was 2 cm and the antero-lateral process was 0.6 cm (Fig 1). The summit of keel was stretched out to the posterior end of the sternum as in fowl (Nickel *et al.*, 1977). The anterior border of the keel was sharp, linear, hollow, crescent or dome shaped structure as in pigeon (Fig 5) (John *et al.*, 2014) and marginally away from the anterior border of the body of the sternum (Fig 5). The antero-lateral process raised from the body of sternum as an antero-lateral horizontal flat projection (Fig 2) as mentioned by Nickel *et al.* (1977) in fowl and pigeon. In antero-lateral process one-third of the anterior border was notched (Fig 4). Anterior border of the sternum was composed of a profound protuberant furrow with pointed corners and continued with the widened and curved outwards to receive the rod-shaped posterior end of the coracoid bones (Fig 2) as described by Nickel *et al.* (1977). The longitudinal groove in the body of the sternum extended from the proximal and disappeared posteriorly (Fig 2). The ventral process alone raised from the dorsal and ventral edges of the furrow and it gets attached into the keel to form a one sharp projection (Pathak *et al.*, 2017) and does not form an opening between them as in duck (Jayachitra *et al.*, 2015). The lateral border was broad anteriorly, slender posteriorly and had six well-defined articular surfaces for the ribs (Fig 2) and the pneumatic foramen were not noticed. Pathak *et al.* (2017) reported that white-breasted waterhen had two medial pneumatic foramina whereas two small pneumatic notches were noticed on both the sides of the anterior border of the body of sternum at its centre (Fig 2) however, in crow

there were several median pneumatic foramen (Sunilkumar *et al.*, 2019). The postero-lateral process was clamp-like at its posterior end (Fig 2&3) as described by Nickel *et al.* (1977) in duck and goose and this process extended beyond the posterior end of the body of the sternum and which was parallel with the body of the sternum. The foramen ovale was noticed between the body of sternum and postero-lateral process in the form of an oval notch as it was noticed in peacock, turkey and duck (Pathak *et al.*, 2017). The foramen ovale was less broad in the form of a W- shaped structure (Fig 3) whereas the foramen ovale was wider in all other birds mentioned by Nickel *et al.* (1977). The thoracic process was not observed in the present study as in duck (Jayachithra *et al.*, 2015).

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Fig. 1. Morphometry of sternum in white-breasted water hen

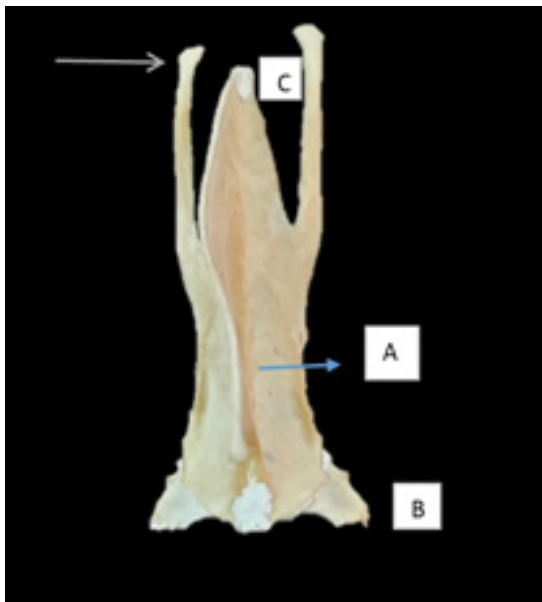


Fig. 3. Ventral view

A., Keel bone, B- Facet for articulation
with coracoid bone and C- Foramen ovale
and arrow indicating W-shaped notch of the
foramen ovale.

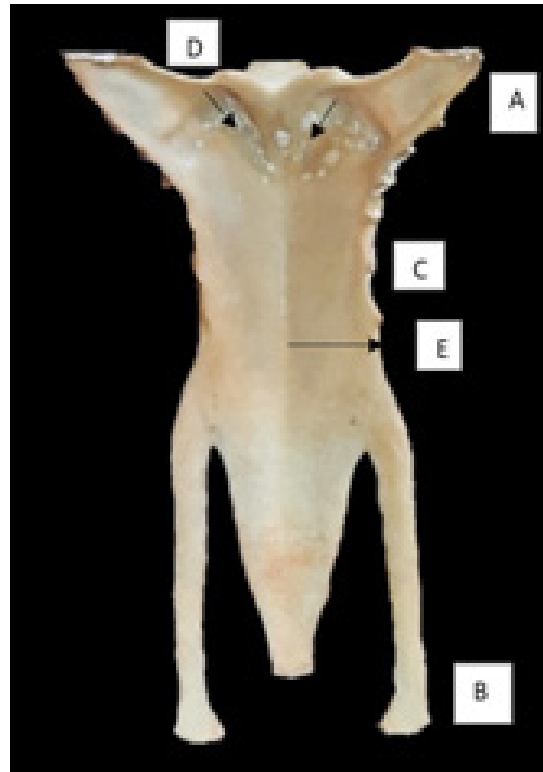


Fig. 2. Dorsal view

A. Antero-lateral process, B- Postero-lateral
process, C- Facets for articulation with ribs,
D- Pneumatic notch and E- Longitudinal
groove

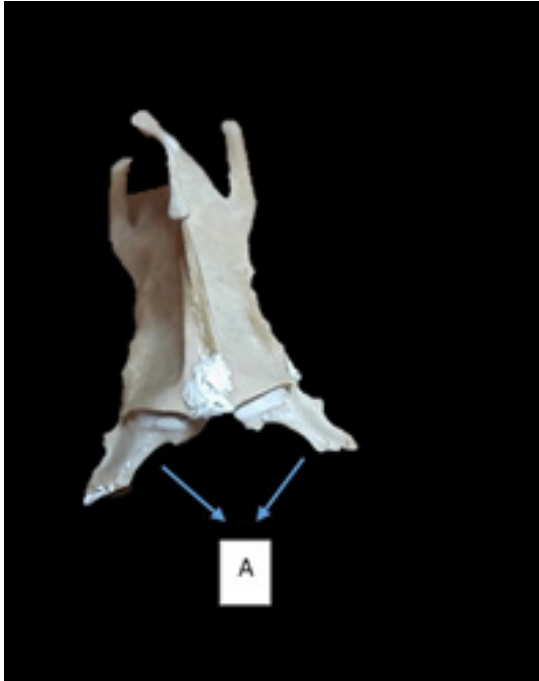


Fig. 4. Cranial view

A. Notch in the anterior border



Fig. 5. Lateral view

A. Dome like structure in the anterior border of the keel bone,

B. Arrows indicating facets for ribs