SHORT COMMUNICATIION

Studies on Skeleton of Common Bronzeback Tree Snake (*Dendrelaphis tristis*)

Hemavathi Nagarajan*, Sivagnanam Shanmugasundaram, Muniyappan Narayanasamy, Sake Mohammed Sathik Basha

ABSTRACT

Dendrelaphis tristis is a non-venomous snake belongs to the Colubridae family. In this study a dead male Common Bronze Back Tree Snake was collected and skeleton was prepared for further study. The length of the body, skull, lower and upper jaw was measured as 795 mm, 25 mm, 32 mm and 22 mm respectively. The skeleton revealed a total of 314 vertebrae with a corresponding 163 pairs of ribs. Vertebral column was grouped as pre- and post-caudal region based on their anatomical variations. Cervical, first thoracic and post-caudal group of vertebrae didn't articulate with ribs. Sternum was absent and remnant of pectoral and pelvic girdle was not observed. Thus, these observations will enhance the basic knowledge about the bones of Common Bronze Back tree snake for future conservational studies in the field of herpetology.

Key words: Bronze Back, Colubridae, Skeleton, Tree snake.

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Introduction

Common Bronze-Back tree snake, *Dendrelaphis tristis* is a non-venomous snake belonging to the Colubridae family. It is widely distributed throughout the India, Pakistan, China and Australia (Whitaker, 1978). Members of the genus Dendrelaphis had a long, slender body and diurnal species that were predominantly arboreal, feeding mainly on lizards and amphibians (Ziegler and Vogel, 1999). Generally, snake anatomy had been neglected all the time. Very few early records were available. Common anatomical details of this Colubridae snake are very scanty. It is more important to comprehend snake's anatomical specializations if we need to understand the evolutionary trends among modern reptiles. Hence, the aim of this study was to record the anatomical features of Common Bronze back tree snake and document them for further wildlife forensic studies.

Materials and Methods

In this study, a carcass of a male snake was procured from the roadsides of Thanjavur, Tamil Nadu. The snake was died due to injuries by the vehicles. It was identified as Common Bronze Back Tree Snake by its characteristic physical features. Organs were removed by making mid ventral incision on the body. Then the carcass was positioned and tied in a desirable mounting state and kept in shady area for dry maceration by bugs without water. After 10 days the skeleton was collected in intact position. Skeleton was washed with antiseptic solution to avoid future hindrances and fallen ribs were articulated and assembled. After preparation of the entire skeleton, it was furnished for glossy appearance.

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Results and Discussion

Dendrelaphis tristis snake was identified by its long, slender body covered by smooth scales. It was yellowish-white or greenish-white in colour, which extends to first two dorsal rows. Sub-caudal scales were olive tint of yellow or brown in colour. Head was flattened, elongated and broader than the neck. Bronze coloured thin tail was very long and pointed at the end. Scales present at the posterior aspect of cloaca were paired and arranged in a zigzag manner. Similar observations were recorded earlier by Rao *et al.* (2017) in Bronze Back tree snake.

The length of the body and skull was measured and recorded as 795 mm and 25 mm, respectively. Harikrishnan *et al.* (2007) measured *Dendrelaphis pictus* snake as about 634 mm, and Srinivasulu *et al.* (2021) measured total body length as 560 mm in *Dendrelaphis tristis* male snake, which are contrary to the present finding. The snake skeleton did

not have any pectoral and pelvic limb bones that indicate the evolutionary changes of reptiles (Woltering *et al.,* 2009).

Skull

The upper jaw and lower jaw were measured about 22 mm and 32 mm in length, respectively. Four rows of teeth were observed in the upper jaw in which outer two rows were attached to maxillary bone and inner two rows with palatine and pterygoid bones. The arrangement of maxillary, palatine and mandibular teeth was common to the arrangement present in all non-venomous snakes. The maxillary and palatine-pterygoid teeth were counted as 19 and 29 in numbers, respectively (Fig. 1). These results concurred with the observations of Scanferla *et al.* (2013) in Macrostomatans and Smith (1943) in *Dendrelaphis tristis*.

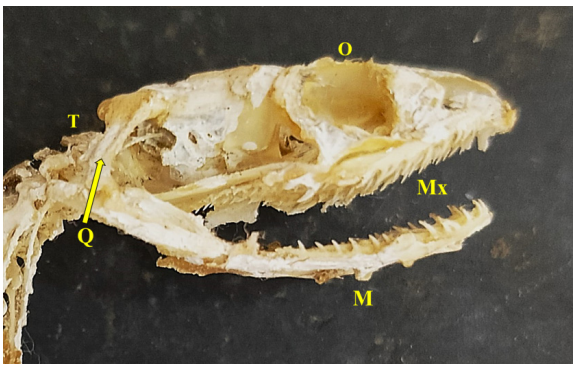

Fig. 1: Photograph showing teeth of upper and lower jaws of Common Bronze Back Tree Snake. M-Mandible; Mx-Maxilla; O-Orbit; Q- Quadrate Bone; T- First thoracic vertebra

Both sides of mandible of lower jaw were free and not forming mandibular symphysis. Each side of mandible was studded with 20 numbers of mandibular teeth. Teeth were spear-shaped and curved backward (Fig. 2). The size of the teeth was gradually decreased posteriorly. The number of teeth in upper jaw was 29 in tree snake, which is consistent with the findings of Cundall *et al.* (2012) in snakes. In case of Indian rock Python each side of the lower jaw was divided into outer and inner part and embedded with 18 and 6 teeth pointed backwardly (Shil *et al.,* 2013).

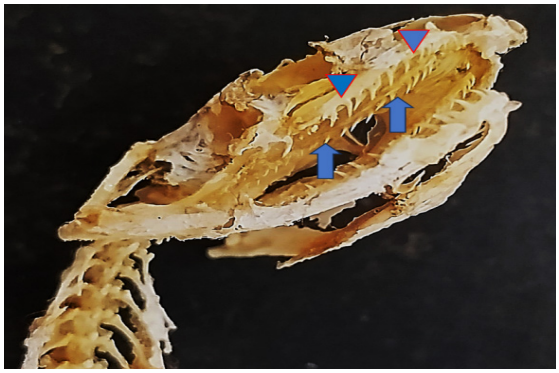

Fig. 2: Photograph of ventral view of upper jaws of Common Bronze Back Tree Snake showing outer Maxillary (arrowheads) and inner palatine-pterygoid teeth (arrows). Teeth were curved posteriorly.

Vertebral column

The vertebral column of the snake was made up of 314 vertebrae. The vertebral column was divided into two groups as pre-caudal region and post-caudal region from the location of cloaca (Fig. 3). Sinha (2020), however, distinguished vertebral column into five regions - the cervical, thoracic, pelvic, sacral and coccygeal region. The entire vertebra had similar articular processes from body like in front, *i.e.,* pre-zygapophysis and behind post-zygapophysis.

Fig. 3: Photograph showing entire vertebral column and ribs of Common Bronze Back Tree Snake

Pre-caudal region bones had received free ribs and divided into cervical, thoracic, lumbar sub-regions based on their anatomical variations. Cervical region consisted of two bones, atlas and axis which did not articulate with ribs. The atlas of the snake was rounded in shape and articulating with occipital condyle. The axis bone was stouter and had dens in its anterior. Thoracic sub-region bones were differentiated by prominently developed hypapophyses. The bones next to this region completely lack hypapophyses, was grouped under lumbar sub-region.

Post-caudal region bones contained fixed ribs and they were divided into three sub-regions as anterior, middle and posterior. Vertebra of anterior sub-region had bifurcated lymphapophyses on their ventro-lateral aspect of the body, while middle and posterior regions had unforked processes. Plate-like haemapophyses was observed on the ventral aspect of the body of posterior sub-regional bones, while middle region showed lack of those processes.

All the pre-caudal vertebrae articulated with free ribs about 163 pairs, except atlas, axis, first thoracic and post-caudal bones. The ribs were simple and curved rod-like bones with free tapering ends ventrally. Each rib had head part in their proximal extremity. Sizes of the ribs were smaller initially and gradually increased to reach greater size at middle of the body and diminishing towards the cloaca. Distal extremity of the ribs was curved and closely located leaving smaller spaces between them. Sternum was absent in snake, that indicated the organs were resting over the ventral ends of ribs. Like Evans (2010) statement of no limbs in snakes' body, Common Bronze Back Tree Snake also didn't have any remnant of pectoral and pelvic limbs.

In conclusion, these rare observations will provide a basic concept on the gross anatomy of bones of the non-venomous snakes especially on Common Bronze Back Tree Snake for the biologist and zoologist for conservational purpose in future.

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