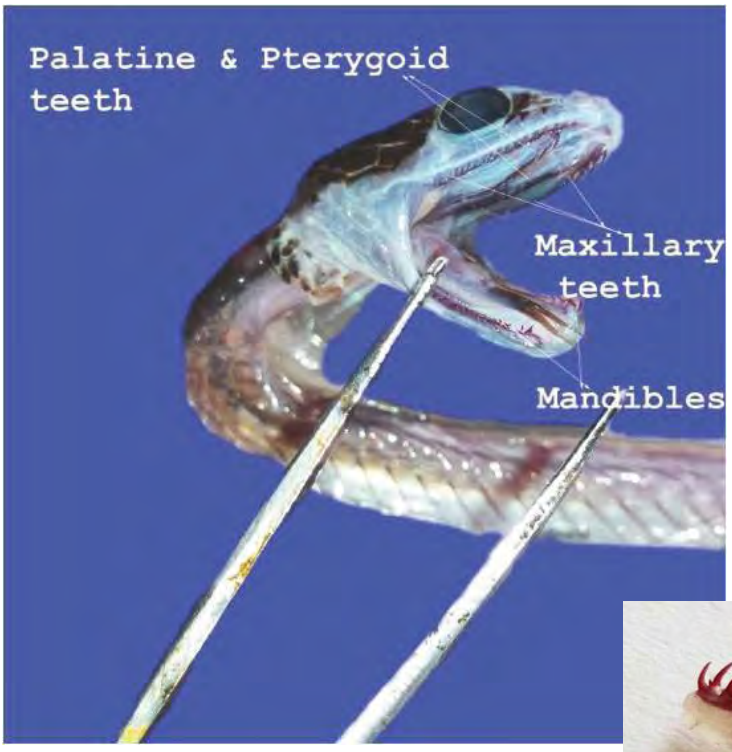
COMMON BRONZE-BACK TREE SNAKE

Gross anatomical studies on male Common Bronze-Back Tree Snake (*Dendrelaphis tristis*) Daudin,1803



Photograph showing four rows of teeth in upper jaw with maxillary teeth and inner palatine and pterygoid teeth and absence of mandibular symphysis

IUCN Red List:

Global — NA

Regional — Least Concern - Peninsular India (Srinivasulu et al. 2014)

Photograph showing needle shaped, recurved mandibular teeth and gradually decrease of teeth towards the posterior end.

Reptilia
[Class of Reptiles]

Squamata
[Order of scaled reptiles]

Colubridae
[Family of snakes]

Dendrelaphis tristis
[Daudin's Bronzeback]

Species described by Daudin in 1803

Abstract

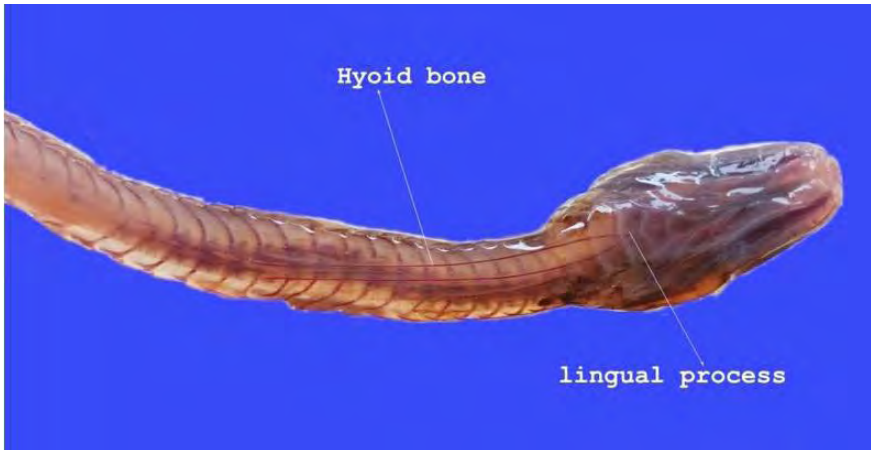
An adult male snake was found dead with multiple injuries just behind the neck region in the College of Veterinary Science, Tirupati premises. The axial skeleton of the snake was studied by Alizarin red Stain method. The entire skeleton was divided into pre-caudal and post-caudal regions. Total number of vertebrae was 326 and showed 182 pairs of ribs. The hyoid bone was resembled as "Y" or fork like structure. Total 204 tracheal rings and anisodont dentition was observed. The upper jaw showed four rows of teeth and whereas lower jaw consisted of two rows of teeth. The well developed quadrate bones were observed at posterior-lateral part of the skull.

Introduction

Common Bronze-Back tree snake belonging to *Colubridae* family is a non-venomous snake and one of the widely distributed snake throughout the India (Whitaker, 1978) and particularly seen in southern India (Smith, 1943).

The information available on the axial skeleton of Common Bronze-Back tree snake is scanty. Hence, the present study was undertaken. The present findings may be useful for zoologists and other researchers.

Global Distribution : Endemic to South Asia (India, Bangladesh, Sri Lanka and Nepal)



Photograph showing hyoid bone with lingual process (Alizarin red)

Photograph showing tracheal rings (Alizarin red)

Methodology

The dead adult male Common Bronze-Back tree snake (*Dendralaphis tristis*) was kept in in Alizarin red Stain to study the skeletal elements (Bancroft and Gamble, 2008) at Department of Veterinary Anatomy, College of Veterinary Science, Tirupati, A.P, India. Further the dissection microscope was also used to identify the articulations within the skull bones and articulations between the vertebrae.

Results

The total length of body of snake was 560 mm, while vent to tip of the tail was 270 mm. The upper jaw showed four rows of teeth, in which two rows attached to the maxillary bone which were confined to the outer margin and two rows attached to the palatine and pterygoid bones which were confined to inner line. The maxillary teeth were 19 in number and present in single row on outer side of upper jaw. They were sharply pointed, recurved. The anterior maxillary teeth were relatively larger. Each side of palatine and pterygoid bones of upper jaw also showed 29 teeth, which were also sharply pointed, recurved, the size of teeth gradually decreased towards the posterior. Lower jaw consisted of right and left mandibles and without mandibular symphysis. Each side of jaw showed single row of mandibular teeth and they were 20 in number, which were also pointed, recurved. The anterior 2nd and 3rd teeth were larger than the remaining mandibular teeth, then the size of teeth gradually reduced towards the posterior of mandible.

The well developed quadrate bones were present on either side of the skull, which joined ventrally with mandibles and dorsally with supra-temporal bones. Hyoid apparatus present on the ventral portion of the head. It is a fork like or "Y" shaped structure that has parallel cornua extending up to 15th vertebra. It was measured 33 mm in length and also showed small anterior lingual process with 2 mm in length. Tracheal rings were also observed in Alizarin red stain from the caudal to the tongue which were 204 in number.

The backbone of the snake was made up of 326 vertebrae. The vertebrae in the body area were almost similar. A special set of projections were also present in the body of vertebrae at articulate processes in front i.e pre-zygapophysis and rear of the vertebrae i.e post-zygapophysis. This gives the unusual flexibility to the back bone. The ribs were simple, single-headed and curved type and their number were 182 pairs but atlas and axis do not bear the ribs. The ribs did not joined below but have free ends. They were vary in size but are structurally much alike. Size of the ribs were initially smaller, then gradually reach greater size at middle of the body but again reduced towards the cloaca. From 185 vertebra onwards rudimentary ribs were also noticed up to 13 post-cloacal vertebrae. Hemipenis were noticed and it was extend near to 7th post-cloacal vertebrae and these were also showed Alizarin red stain particles.

The elongated skeleton made up of 326 vertebrae without noticeable limbs is a evolutionary change in snakes

Discussion

In the present study total length of the snake body from snout to vent is 560 mm in length while vent to tip of the tail is 270 mm in length contrary to this *Dendrelaphis pictus* has 634 mm in length from snout to vent while 389 mm in length from vent to tip of tail (Harikrishnan *et al*, 2007). The total number of 326 vertebrae were noticed in the elongated skeleton without noticeable limbs, do not possess true thoracic or lumber vertebrae but rib-less or rib bearing vertebrae were present it indicates evolution changes of reptiles (Woltering, 2012). Contrary to this only primitive snakes such as Boas and Pythons do possess vestigial hind limbs at the cloaca (Cohn and Tickle, 1999). In the present study Bronze-Back tree snake showed 326 vertebrae in these pre-caudal vertebrae showed 182 pairs of ribs whereas corn snake has 315 vertebrae in which 230 pre-caudal vertebrae bears ribs (Woltering *et al*, 2009).

In non-venomous snake upper jaw showed four rows of teeth, in which two rows attached to the maxillary bone another two rows attached to palatine and pterygoid bones while, lower jaw showed single row of mandibular teeth. All teeth were sharply pointed, curved backwards direction, then the size of the teeth gradually reduced towards posterior, it is in-agreement with the observation made by Agustin *et al,* (2013) in Macrostomatans and Smith (1943) in *Dendralaphis tristis*.

Each side of palatine and pterygoid bones of upper jaw showed 29 teeth similar observation were also made by Cundall *et al*, (2012) in snakes. The well developed quadrate bones were present on posterior-lateral aspect of the skull, which joined ventrally with mandibles and dorsally with supra-temporal bones, lower jaw made up of right and left mandibles so that the anatomical architecture of mouth of snake allows limited functional independence of the right and left sides and allows wide separation of the mandibular tips due to absence of mandibular symphysis. The jaws were considered as part of the head, but in many snakes, the jaws joints lies well posterior to the base of the skull (Cundall *et al*, 2014).

Hyoid bone observed at the ventral portion of the head, which is a fork like or “Y” shaped structure, It has parallel cornua extending up to 15th vertebra with small anterior lingual process as observed by Smith and Macky (1990) in snakes whereas Langebartel (1968) state that hyoid apparatus in snakes has unusal forms and positions. Total 204 tracheal rings were observed from the caudal to the tongue. McDowell (1972) opined that the trachea and tongue lie in the middle of the floor of the mouth in snakes.

Conclusion

The elongated skeleton made up of 326 vertebrae without noticeable limbs is a evolutionary change in snakes. The bones of the skull, except for those of the braincase were very loosely connected to one another. The circumference of the oral cavity significantly greater in size than in other animals due to absence of mandibular symphysis. Further mandibular rotations limited by quadrate articulation and so that each element in the jaw can move individually. Thus the architecture of snake skull is constructed as a creature of high mobility and flexibility. Due to backward direction of teeth, the snakes use their teeth for grasping and swallowing, so once a prey is swallowed by the snake it move towards the stomach only.

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