البحث السادس

The Development of the Skull of the Egyptian CobraNaja h. haje(Squamata: Serpentes: Elapidae)

Abstract

Background

The study of craniofacial development is important in understanding the ontogenetic processes behind morphological diversity. A complete morphological description of the embryonic skull development of the Egyptian cobra,Naja h.haje, is lacking and there has been

little comparative discussion of skull development either among elapid snakes or between

them and other snakes.

Methodology/Principal Findings

We present a description of skull development through a full sequence of developmental

stages of the Egyptian cobra, and compare it to other snakes. Associated soft tissues of

the head are noted where relevant. The first visible ossification centres are in the supratemporal, prearticular and surangular, with slight ossification visible in parts of the maxilla,

prefrontal, and dentary. Epiotic centres of ossification are present in the supraoccipital,

and the body of the supraoccipital forms from the tectum posterior not the tectum synoticum. The venom glands are visible as distinct bodies as early at stage 5 and enlarge later

to extend from the otic capsule to the maxilla level with the anterior margin of the eye. The

gland becomes more prominent shortly before hatching, concomitant with the development of the fangs. The tongue shows incipient forking at stage 5, and becomes fully bifid

at stage 6.

Conclusions/Significance

We present the first detailed staging series of cranial development for the Egyptian cobra,

Naja h.haje. This is one of the first studies since the classical works of G. de Beer and W.

Parker that provides a detailed description of cranial development in an advanced snake

species. It allows us to correct errors and misinterpretations in previous accounts which

were based on a small sample of specimens of uncertain age. Our results highlight potentially significant variation in supraoccipital formation among squamates and the need for further research in this area.