Age and growth of the Indian squid *Uroteuthis duvaucelii* based on statolith microstructure analysis from the tropical Arabian Sea

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The Indian squid *Uroteuthis duvaucelii* is distributed widely in the continental shelf waters of the Indo-West Pacific Seas and also contributes a major share of the annual squid landing from the Indian waters. Age and growth rate information is one of the most important set of variables for estimating population dynamics of the species. Earlier works on the age and growth of squids along the Indian subcontinent were mainly based on length-frequency analysis. Recent studies have proven that length-frequency analysis overestimate the life span and underestimate the growth rate of squids. Therefore, the aim of this study is to understand the age and growth of the Indian squid in the Arabian Sea based on analysis of the statolith growth increment, which has already been applied to growth studies in many squid species. A total of 432 (male: 235; female: 197) individuals of the Indian squid were sampled from the commercial trawlers operating along the southwest coast of India.

The dorsal mantle length (DML) of the aged individuals ranged from 30 to 350 mm (30-350 for males and 32-207 mm for females). Based on statolith increment counts, the youngest squid was a 53 days old male with a DML of 33 mm. The maximum age was observed 146 days in females (160 mm DML) and 170 days in males (296 mm DML). The Indian squid, is therefore a fast-growing squid. The absolute daily growth rate of the females ranged from 0.43 mm to 1.91 mm DML/day and in males it ranged from 0.44 to 2.41 mm DML/day. In either sex, the highest value of instantaneous growth rate of males (13.65 %) and females (13.62 %) was observed in 75 days old individuals. After the age of 75 days the instantaneous growth rate got decreased gradually to 1.9% for females and 0.3% for males.

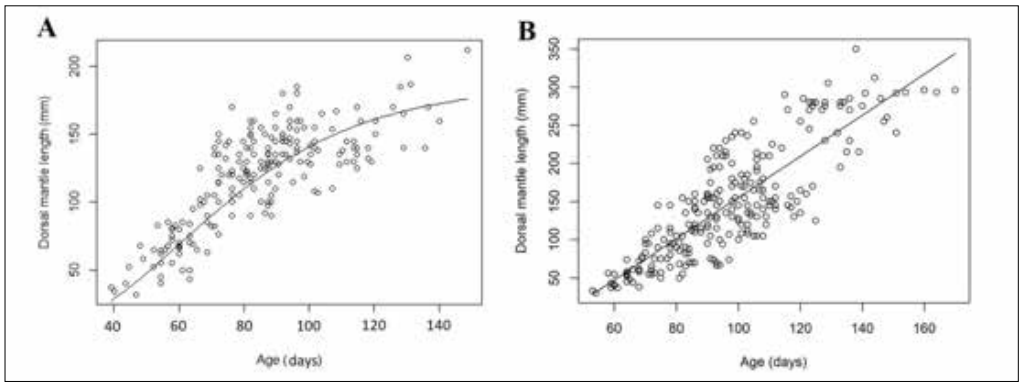

Fig.1 Relationship between dorsal mantle length (DML) and age of females (A=Gompertz) and males (B=Linear) of *Uroteuthis duvaucelii* from the Arabian Sea

Total six growth models for size at age data such as Linear, Von Bertalanffy, Power, Schnute, Exponential and Gompertz were fitted for both male and females. Using the Akaike's Information Criterion (AIC), the growth pattern of *U. duvaucelii* from the Arabian Sea was best described by the Gompertz model for females (L_∞= 195 mm (SE: 13.02) and Linear model for males (Fig.1 & Table. 1).

Table.1 Growth model selection for males and females of *Uroteuthis duvaucelii* from the Arabian Sea; AIC= Akaike's information criteria; Δk= Differences in AIC; *Wk*= Akaike weight. Bold font indicates the selected models

Model	Males			Females		
	AIC	Δ^k	W^k	AIC	Δ^k	W^k
Linear	2482.05	0.000	4.033307e-01	1915.94	61.534	4.149685e-14
Von Bertalanffy	2482.90	0.848	2.639492e-01	1860.52	6.105	4.510966e-02
Power	2493.23	11.177	1.508713e-03	1910.12	55.704	7.655677e-13
Schnute	2998.02	515.961	3.682593e-113	2347.52	493.108	7.996718e-108
Gompertz	2482.45	0.394	3.312114e-01	1854.41	0.000	9.548903e-01
Exponential	2524.07	41.961	3.118501e-10	1939.52	85.108	3.154904e-19