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Record of Juvenile Stages of *Cypraea turdus* Lamarck 1810 from Karachi Coast

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Abstract

Eight sequential growth stages of *Cypraea turdus Lamarck,* from juvenile to the adult have been described from Karachi coast. The transformation of juvenile into the subadult and adult stage along with the radical changes that occur in the shape of the shell during the course of growth, have been discussed.

Keywords: Growth stages, *Cypraea turdus*

Introduction

In January 2003, juvenile and adult stages of *Cypraea turdus* (Lmarack, 1810) were collected from Buleji, Karachi coast. Khan and Dastagir (1970) and Tirmizi and Zehra (1984) have previously reported this species from Pakistan coast. Barkati and Ahmad (1984) have described the spawn and early larval development of *Cypraea turdus* and *C. arabica*. Perveen, (1988) studied reproductive biology and larval development of some common molluscs from Pakistan coast including study of early development of Cypraea trudus i.e. from its egg to the veliger larva stage. However, no work seems to have been done on the growth phases of *Cypraea* species from Pakistan coast.

Growth phases of *Cypraea zebra* was studied by Abbot (1968) Hornell (1955) described the stages through which a cowry changes in shape and colour from immature to perfect shell. Ray (1951) and Rao (2003) described changes at different growth phases in cowries.

Materials and Methods

Specimens of *Cypraea turdus* were collected from Buleji coast (24^{o} 54$^{'}$ N, 66^{o} 48’ E), Karachi. The specimens were preserved in 5% formaldehyde after narcotization. Measurements of the shells (length and breadth) were taken with the help of vernier caliper.

Results

On the basis of morphological characters the individuals were identified as juvenile of *Cypraea. turdus* (Lamarck, 1810) and ranked into 6 stages (Stage 1-6). One specimen (stage-6), which had assumed the shape of adult *Cypraea,* was ranked as a sub adult *C. turdus.* One advanced sub-adult (stage-7) and one adult of *C. turdus* (stage-8) were obtained from the previous collections of Zoological Survey Department from the same area. The study, therefore, covers a total of 8 specimen; five of them were juvenile, one sub-adult, one advanced sub-adult and one was ranked as adult (Table-I).

Table I. Measurements (in mm) of growth stages of *Cypraea turdus.*

Stages	Juvenile					Sub-adult	Advanced Sub-Adult	Adult
	1	2	3	4	5	6	7	8
Length	16.7	23.2	26.4	27.0	29.6	30.2	32.2	40.0
Breadth	11.4	13.6	14.2	17.9	20.0	20.58	22	29.3

Juvenile Stage 1 (Fig. 1)

The body whorl is elongate having a narrow aperture. The outer lip is sharp, thin and fragile. The spire is depressed but the pointed apex can be felt with finger tip.

Fig. 1. Growth stages of *Cypraea turdus*: .Juvenile stages.

Juvenile Stages 2 & 3 (Fig. 1)

The aperture is moderately broad. The apex is pointed and can be felt with finger tip. The spire is depressed. The outer-lip is thin and fragile showing sign of turning in towards the columella. The gradual increment in length and breadth seems to occur at these stages.

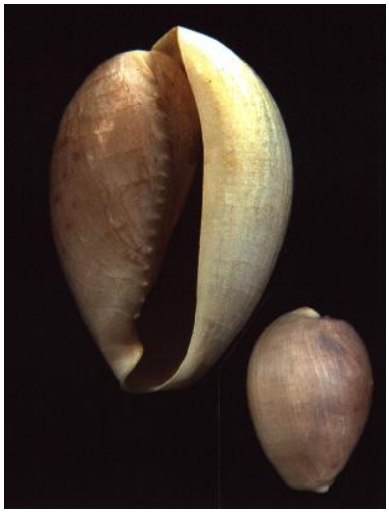

Fig. 2. Growth stages of *Cypraea turdus*: .Sub Adult stages.

Juvenile Stages 4 & 5:: (Fig. 1)

The outer lip has turned abruptly in towards the columella. The sunken spire with apex is prominently depressed. The bulging out and slight thickening of the wall of outer lip is clearly visible. Siphonal canal seems to assume its peculiar shape. No teeth or markings are visible on inner or outer lip.

Sub-Adult Stage 6 (Fig. 2)

The drastic change in the shape of the shell has now occurred and the inward turning of the outer lip has taken place. The shell has now acquired the shape of typical cypraeid and has become comparatively stronger and heavier. However the teeth are developed on the inner lip only. The outer lip is still without teeth. The sunken spire seems to be disappearing in a depression. The apex is not felt with finger tip. The callus portion is feebly developed. The colour pattern begins to take on the adult characters as light brown spots seem to appear on the dorsum. Aperture is also narrowed.

Fig. 3. Growth stages of *Cypraea turdus*: .Advanced Sub-adult stage

Advanced Sub-Adult Stage 7 (Fig. 3)

The whitish callus is heavily deposited on the margins. Sides of the shell distinctly marked with reddish brown spots. The teeth/ridges on the inner as well as outer lip are clearly visible. Siphonal canal has assumed its shape. The sunken spire has lost its identity and seems to be disappearing. The aperture has become considerably narrow. Reddish brown spots are prominently seen on the dorsum This stage may be regarded as advanced sub adult phase.

Fig. 4. Growth stages of *Cypraea turdus*: . Adult stage.

Adult Stage 8 (Fig. 4)

The shell has become stronger and heavier. The spire is totally concealed with enamel deposits. The aperture is narrow with well developed teeth on the inner as well as the outer lip. Margins become heavily deposited with callus. Dorsum is profusely covered by reddish brown spots and the margins have larger purple spots. Base is white.

Discussion

The study of the sequential growth phases indicates that *Cypraea turdus* assumes radically different shape on reaching maturity. The young shells of *C. turdus* differ greatly in appearance from its adult. Juvenile stages resemble *Bulla* spp. due to the expanded outer lip of the body whorl. However, in Bulla, the apex of the spire is never pointed rather it is flat or depressed, whereas in juvenile *Cypraea* it is pointed and diminishes gradually as it reaches mature stage. Ultimately on attaining maturity, the adult shows no sign of apex and the shell becomes more solid.

During the growth phases the thickening and gradual inward turning of the outer lip towards columella is noteworthy. As soon as the young takes the form of *Cypraea*, teeth appear on the inner lip. At first these marks can only be seen with hand lens, but on further development these are seen with naked eye (Fig. 2b). The callus is also heavily deposited around the margins. The siphonal canal has assumed its shape. This phase may be regarded as sub-adult stage. Fig. 7 shows a stage where the ridges are quite clearly visible on both the lips and the callus is seen surrounding the inner as well as outer lip. The coiling impression of the spire is not yet totally disappeared. The brownish spots appear on the dorsum and siphonal canal has assumed its shape. This stage may be termed as an advanced sub adult stage. Fig. 8 shows a full grown adult individual. The spire has totally disappeared, the teeth and the callus are fully developed. The coloration of the adult *Cypraea turdus* is in its perfect condition. The reddish brown spots are prominent on the dorsum. The description of the adult fully agrees with Kira (1962), Oliver (1975), Rao (2003), Schilder and Schilder (1939) and Tirmizi and Zehra (1984). Study of various stages clearly indicate the pattern of growth and the changes that occur in the shell of *Cypraea turdus* during its development from young to the adult.

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