Successful Laboratory Rearing –A tool for conservation of Indian horseshoe crab, *Tachypleus gigas*

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3rd International workshop on the science & conservation of Horseshoe crabs

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Introduction

- **The horseshoe crabs are benthic animals and descended from mud dwelling primitive arthropods called trilobite which lived in the Precambrian seas, nearly 600 million years ago (Price, 1971).**
- **In India, the horseshoe crabs regularly migrate towards the shore for the purpose of breeding (Mikkelsen, 1988; Kelsey and Hassall, 1989; Chatterji, 1994).**
- **In the world, the horseshoe crabs are now represented by four existing species (Sekiguchi and Nakamura 1979).**
- **The Indian horseshoe crab i.e. *T.gigas & C. rotundicauda* are found in east coast of India extending from West Bengal up to Andhra Pradesh. But *T. gigas* are abundantly available in north- east coast of Odisha extending from Subarnarekha estuary up to Kansha estuary.**
- **But at present it is a major concern that the population of all the species is in a declining trend. But the reasons for the population depletion for all species and the degree of their exploitation are mainly manmade.**
- **There is need to study breeding biology of these Indian horseshoe crabs available in Odisha as they are in a different geographical area.**

Worldwide distribution

TACHYPLEUS TRIDENTATUS (POCOCK)
Western & Southern Japan, Taiwan, Philiphines & North Borneo, Malaysia

LIMULUS POLYPHEMUS (MULLER)
Atlantic Coast of North America from Maine to Yucatam

TACHYPLEUS GIGAS (MULLER)
Bay of Bengal (North - East Coast), Thailand, Malaysia, Philiphines, Borneo & Torres Straits

CARCINOS CORPIUS ROTUNDICAUDA (LATREILLE)
Bay of Bengal, Thailand, Malaysia, Philiphines, Borneo & Torres Straits.

Objectives

- Hatching and captive rearing of Indian horseshoe crab *Tachypleus gigas* under laboratory condition.
- To gain Knowledge about the breeding biology of these valuable animals.
- To save the endangered populations of this species from extinction by sea releasing

Materials and Methods

- Selection of nesting ground
- Identification of nests
- Collection and separation of viable eggs
- Incubation of eggs
- Hatching of larvae
- Rearing of larvae

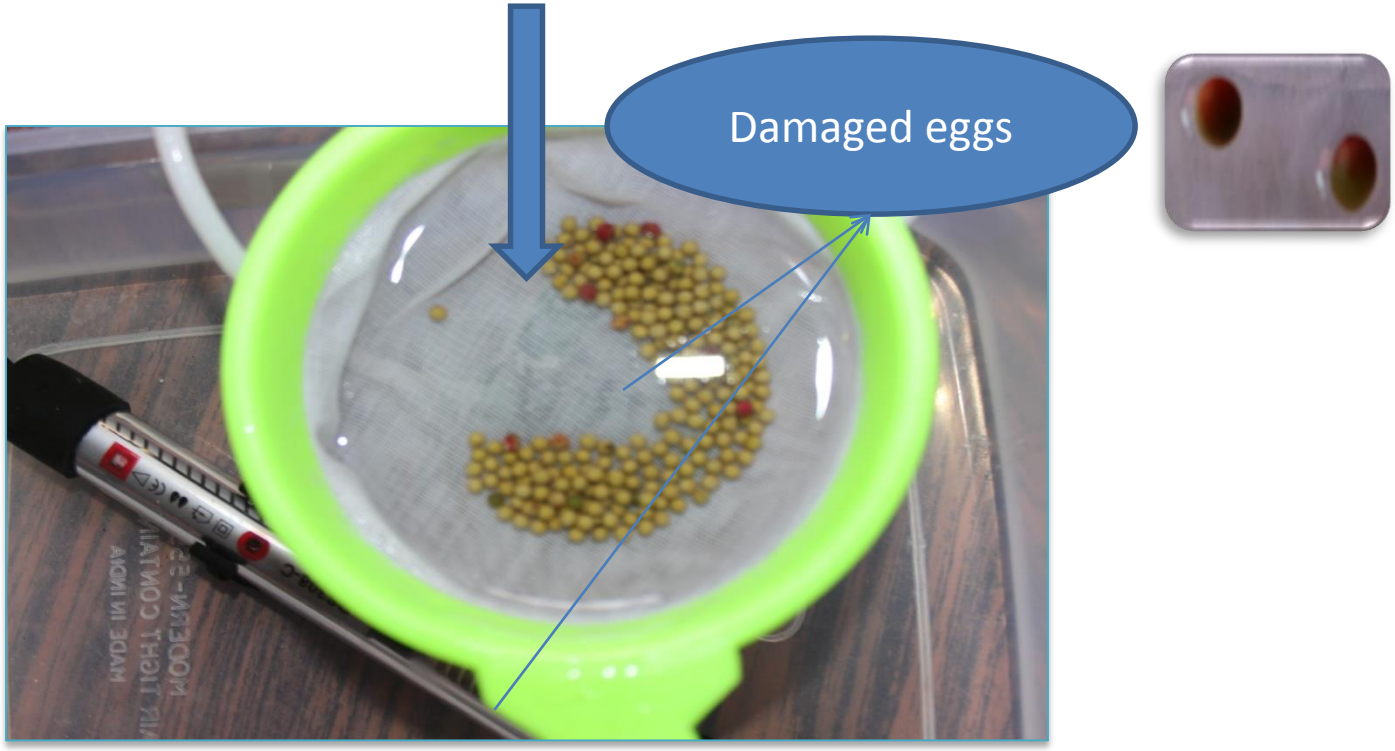

Amplexed
horseshoe crab


Identification of
nest by reprints

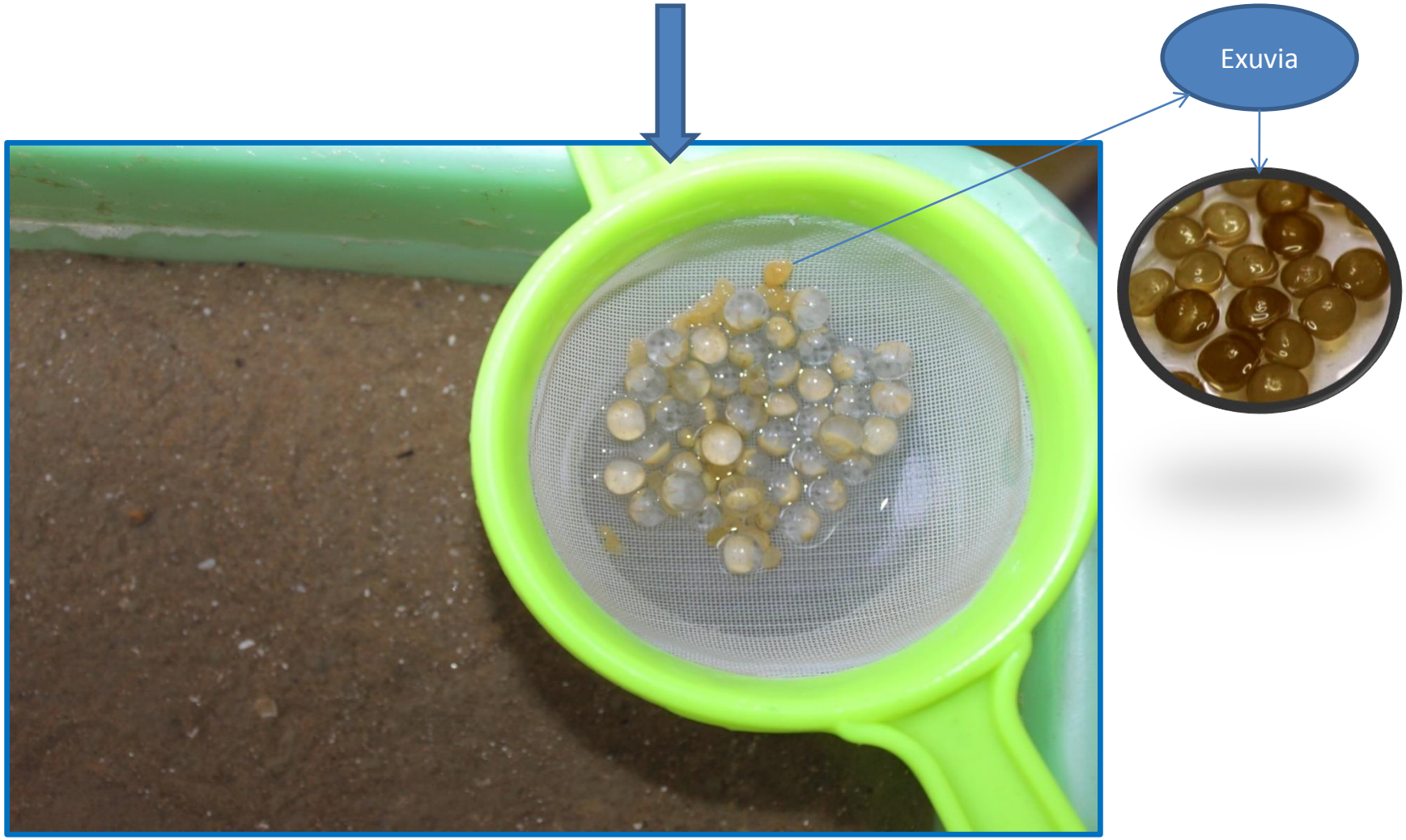
Collection of eggs from nest

Separation of eggs

Incubation of collected eggs in laboratory condition



Molting of embryo

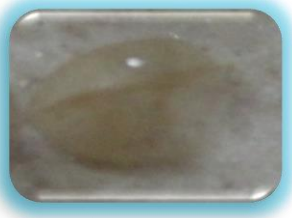


Trilobites to be hatched

Hatching of trilobite larvae

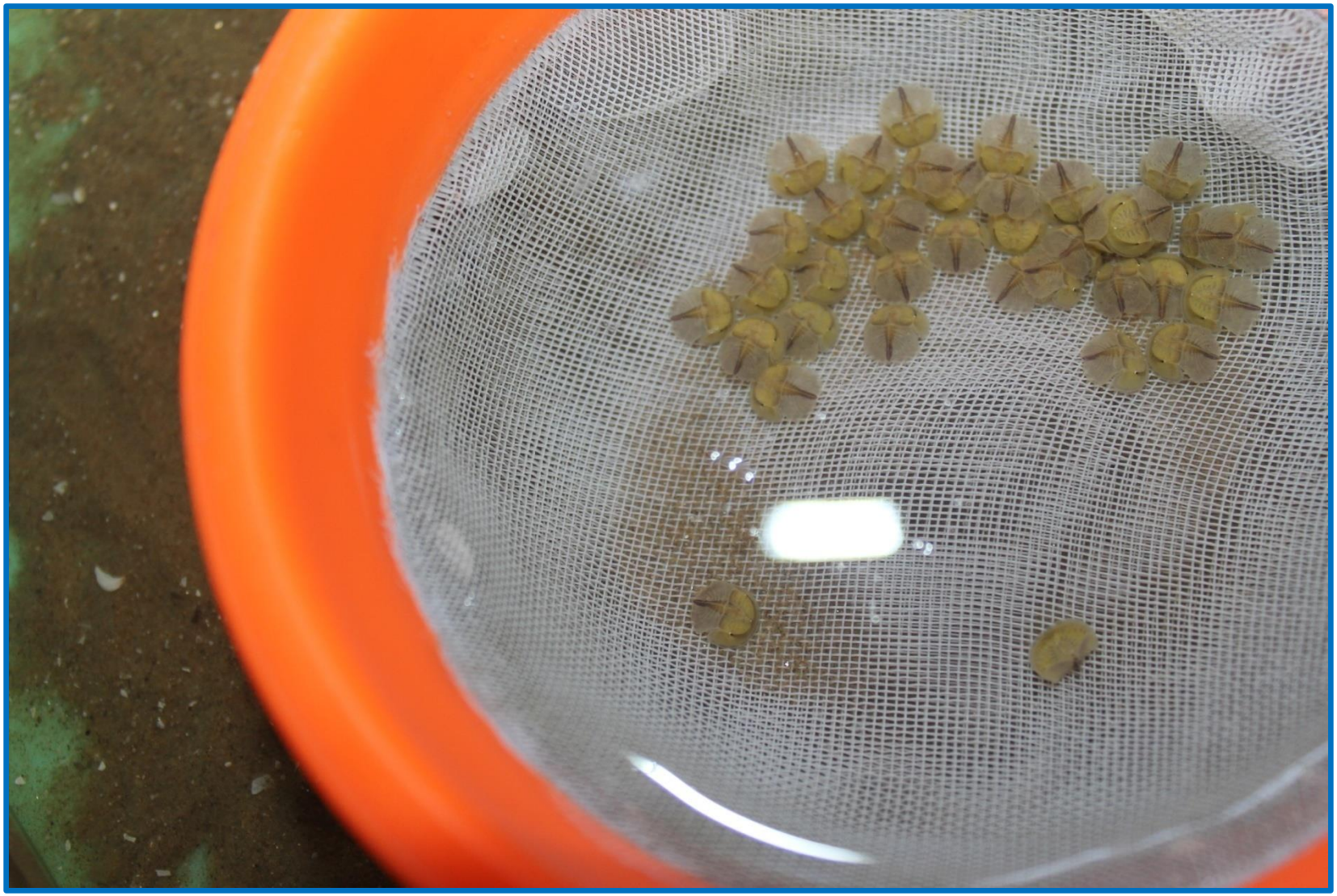
Larva to be hatched

Newly hatched larva

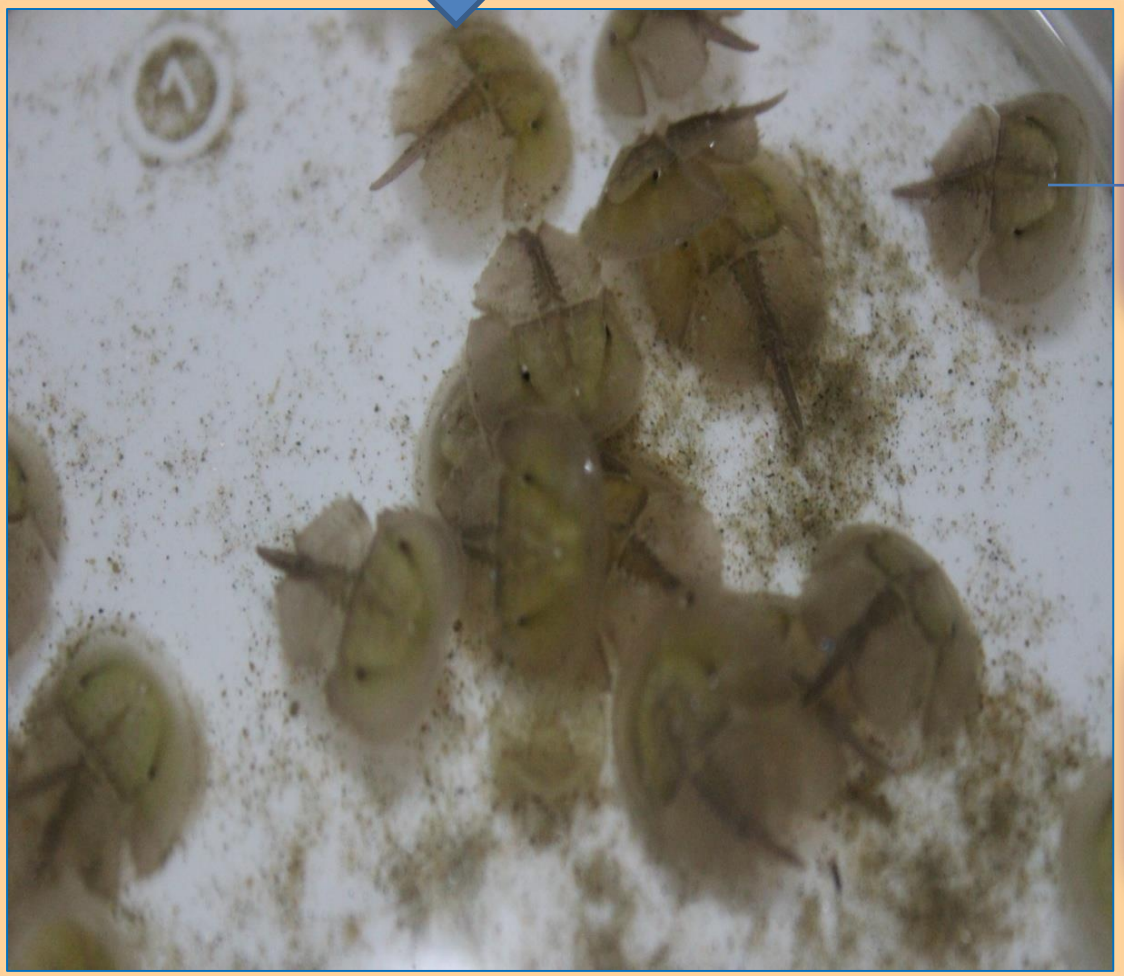


Peri -viteline membrane

Newly hatched trilobites



First molting – second instar larvae

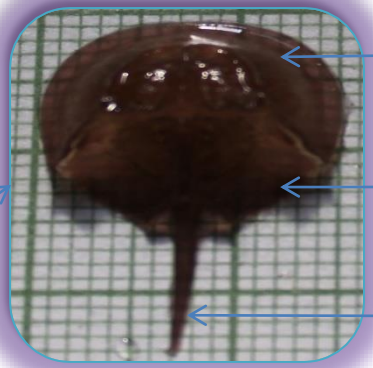


Second instar larva

Exuvium of first molting

FEEDING MOVEMENT OF LARVAE

Second molting –third instar larvae



Prosoma

Opisthosoma

Telson

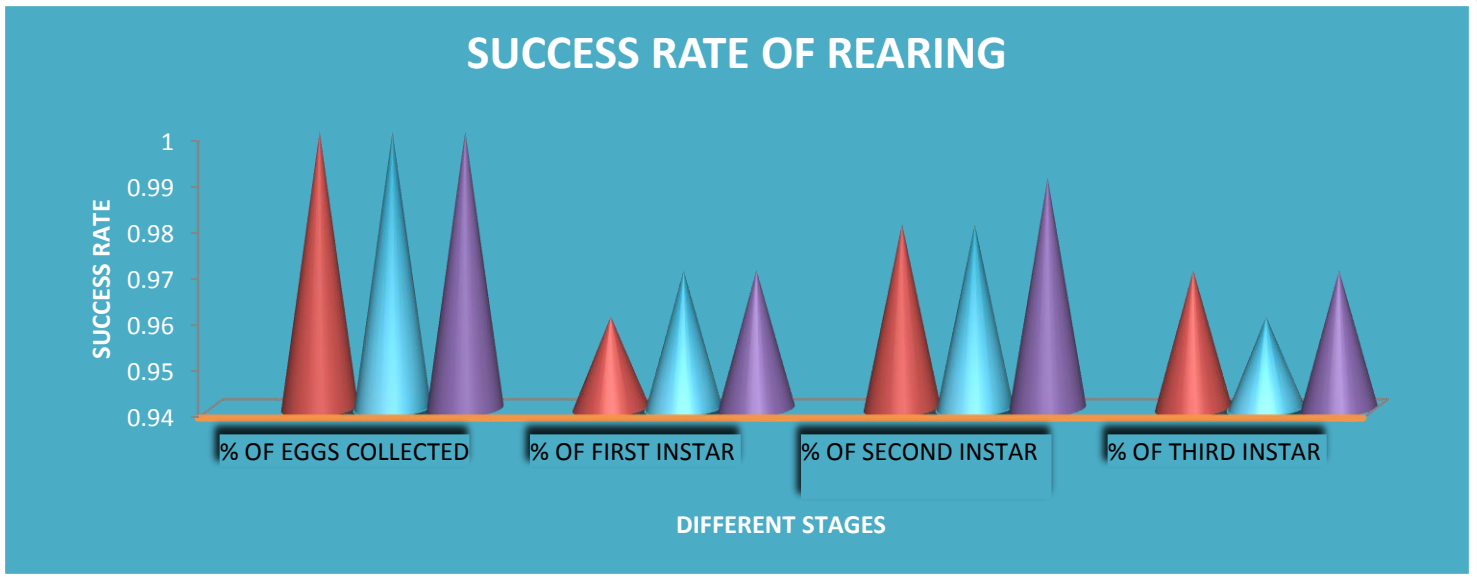
Exuvium of second molting

RESULTS AND DISCUSSION

Eggs collected from **MAHISALI ESTUARY**

HATCHING AT 26 c TEMP. AND 25 PPT SALINITY AND TIME TAKEN 35-42 DAYS

NEST	DIAMETER OF NEST(CM)	DEPTH OF THE NEST(CM)	NO. OF EGGS	NO. OF DEFECTIVE EGGS	NO OF FIRST INSTAR LARVAE	% OF FIRST INSTAR LARVAE	NO OF SECOND INSTAR LARVAE	% OF SECOND INSTAR LARVAE	NO OF THIRD INSTART LARVAE	% OF THIRD INSTAR LARVAE
A	18	9	85	5	77	96%	76	98%	74	97%
B	19	9	102	7	92	97%	90	98%	87	96%
C	22	10	128	8	116	97%	115	99%	112	97%



RESULTS AND DISCUSSION

- The fertilized eggs were hatched as per the natural reported time period of 42 days of incubation and with a hatching rate of 98.0%. Trilobites have molt up to the third post hatched juvenile stage within a period of 90 days from the day of hatching as free swimming larval stage with 97% success. All the post hatched juveniles had similar morphological characteristics as that of the adults.
- Over the past century, the dreadful conditions of habitat, especially the marine pollution, human exploitation for food and bio-medical production, loss of spawning and nursery grounds, has led to a decline in population of horseshoe crabs in many parts of the world and this species have been scheduled on the IUCN Red list and among them three ware categorized as data deficient .
- The present work throws some light regarding the artificial rearing of trilobite larvae of *T. gigas* so as to successfully increase the population of such species in this part of globe. More works with large scale rearing strategy need to be done to achieve the targeted goal of sustainable maintenance of Indian horseshoe crabs.

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