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Changes in DNA Contents of Mantle, Hepatopancreas, Gonad and Foot Tissues of Freshwater Bivalve, *Corbicula regularis* From Girna Dam during Different Seasons in Year 2016-17 (Maharashtra) India

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Abstract:
This paper describes the DNA contents of mantle, hepatopancreas, gonad and foot tissues of *Corbicula regularis* (25-37 mm in shell length) were collected from Girna dam Malegaon Dist-Nashik in year 2016-2017.The DNA content maximum found in foot during summer and maximum showed in gonad during monsoon and winter season. The freshwater bivalve shows maximum changes in the DNA contents from gonad, as it undergoes different stages like development, maturation and spawning during different seasons.

Keywords: Freshwater bivalve, *Corbicula regularis, DNA*, Girna Dam.

INTRODUCTION

DNA is the chemical basis of heredity and may be regarded as reserve bank of genetic information.DNA is exclusively responsible for maintaining the identity of different species. Further, every aspect of cellular function is under control of the DNA as the genetic material carries information to specify mono acid sequences in proteins (Satyanarayana, 1999). It is transcribed in to several type of ribonucleic acid (RNA) including mRNA, tRNA and rRNA which function in protein synthesis. Structurally DNA is linear polymer composed of monomer called nucleotides, i.e. Four nitrogen bases, two purines; adenine, guanine and two pyramidine cytosine, thymine. Double helical structure of DNA consist of two polynucleotide strands that winds together to form double helical structure. Many species of bivalve molluscs found in Indians water which can sustain regular growth of development particularly in Maharashtra state several species of commercially, edible and important species both marine and freshwater bivalve plays and imp role as bioindicator to detect various environmental fluctuation. The timing and duration of invertebrate reproduction and larval life cycle is influenced by environmental factors that vary seasonally, like temperature, salinity and light intensity (Weslawski JM. et. al., 1988). Response to environmental cues is species-specific and often related to the influence of physiological (genetic) inheritance of reproductive life history traits (Walker and Heffernan 1994). Traditionally, the study of the effect of seasonality on reproductive traits in bivalve species was hampered by the difficulty in identifying larvae to low taxonomic levels (Schluter and Rachor 2001).

Freshwater bivalves are performing efficient role in transformation and reserved of energy in food chains coupled with their sessile made of life. DNA is the most efficient genetic material which roles in the heredity and variation among organism or transfers the character one generation to the next. (Fetzer I.2004; Timofeev et al. 2007).In the present investigations on the physiological response of bivalve to environmental agents have been expanded significantly. the present study has carried out

to understand the fluctuations genetic material through regular collection of animal from girna dam in Maharashtra.

MATERIALS AND METHODS

The adult Fresh water bivalves, *Corbicula regularis* were collected from of Girna dam which is about at the distance of 50 K.M. away from Chalisgaon City of Maharashtra state. First they are made acclimatized to laboratory condition and after they are washed. The water in the aquarium was changed regularly water after every 24 hours. After the acclimatization bivalves 10-15 mm shell widths and 25 -37 mm length were freshly collected between various different seasons. Immediately after bringing to the laboratory the shells of the animals were clean with freshwater in order to remove the algal biomass and mud.

In year 2016-2017during monsoon July to August), winter (December to January) and summer (April to May) were selected for laboratory experiments. The animals were dissected and soft body tissues like mantle, hepatopancreas, gonad and foot were removed. 100mg of each wet tissues were taken for DNA analysis. DNA content of the tissue was measured by using Diphenylamine method of Burton (1956).10 mg of dry tissue powder was homogenized by adding 10ml distilled water. Then it was centrifuged at 3000 rpm for 10 minutes. The supernatant containing DNA was removed. 1ml of supernatant and 3ml diphenylamine reagent were mixed in test tube and were boiled in boiling water bath for 10 minutes. After boiling the solution in the test tube was allowed to cool. Then the optical density of the DNA was read at 595 nm filter. Array of increasing concentration of standard DNA solution was processed in the same way and the optical densities were read to calculate the concentration of DNA from the sample.

RESULTS

The DNA analysis observed during the experimental work has been given in table-1 in year 2016-17. During monsoon, the gonad shows maximum amount of DNA content (11.457±0.142) on August, whereas it is minimum from mantle (5.145±0.117) on August. During winter, the DNA contents it was maximum shows from gonad (9.145±0.4752) on December and minimum from mantle (5.725±0.254) on December. During summer, the DNA content maximum found from mantle and foot during summer season. The values of DNA observed from mantle (10.473±0.475) on May and 10.457±0.456) on April. Whereas, the DNA contents from foot shows values (11.452±0.277on April and (11.875±0.214) on May. The DNA contents from mantle and foot shows large decrease during monsoon and winter seasons.

Table 1: Changes in the DNA contents of *Corbicula regularis* from Girna dam at Malegaon Dist - Nashik during different seasons in year 2016-17.

Tissues	Monsoon		Winter		Summer	
	July	August	December	January	April	May
Mantle	5.550±0.371	5.145±0.117	5.725±0.254	5.759±0.149	10.457±0.456	10.473±0.475
Hepato-pancreas	5.178±0.478	5.857±0.527	6.475±0.452	6.878±0.212	7.759±0.342	7.875±0.305
Gonad	10.987±0.546	11.457±0.142	9.145±0.475	8.697±0.235	8.967±0.473	8.479±0.169
Foot	8.456±0.421	7.475±0.756	7.425±0.478	6.475±0.148	11.452±0.277	11.875±0.214

DISCUSSION

There is a significant variation in the DNA composition in different soft body tissues according to different seasons. It is observed that DNA content is significantly accumulated in mantle and foot during summer season. Strong seasonality shapes high latitude environments, with intra-annual changes in solar irradiance, ice cover, glacial melt water and mixed layer depth, influencing seasonal

changes in marine benthic fauna (Wlodarska-Kowalczuk and Pearson TH.2004).All the tissues shows constant DNA content during monsoon, which is correlated with highest body organs, shows minimum DNA content during winter season. During monsoon season, gonad show maximum amount of DNA, which is correlated with the maturation of gonadal follicle and time of spawning.
The study revealed that in term of energy conservation. The organic would be exported to make compensatory adjustments to both the components of energy gain and energy loss fate of changes in the environmental conditions. (Vedpathak, A.N. (1989). It is therefore essential to study the effect of environmental variables on the the DNA contents. Therefore, it has been suggested that local environmental variables have a direct effect on the timing, occurrence and duration of larval stages of marine benthic invertebrate species (Fetzer and Arntz 2008). Pelagic larval stages are a vector for dispersal and therefore have the capability to alter the abundance and distribution of benthic invertebrate species at a given site (Thatje 2012). The Major organic reserves, RNA and lipid, declined in the hepatopancreas of Scylla serrata during the period of reproductive activity while inclined in ovary during the same period (Nagabhushanam, R. and Farooqui, U.M (1982): Thus, in the present study of Lamellidens marginalis it is observed that DNA composition present in different soft body tissues shows seasonal fluctuations and mare correlated with fluctuations in the environmental conditions along with developments of reproductive cycle.

CONCLUSION

The study concludes that DNA is the genetic material to transfer character one generation to the next generation. In ecosystem climatic changes in every seasons they become direct effects on the animal physiology in aquatic animals in the cellular level of genetic imbalance .The DNA content shows foot tissues in maximum observed in summer season and in gonad tissues shows maximum observe in winter season . in the this study DNA variability every seasons and each tissues variability observed in of genetic materials.

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