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Research Article

GONADAL INDEX OF THE FRESHWATER SNAIL, *BELLAMYA DISSIMILIS*

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ABSTRACT

Molluscs are a part of the invertebrate macro fauna of freshwater habitats throughout the world. Genus *Bellamya* (family viviparidae) is proven food for many aquatic animals and aquatic birds. The driving force in life cycle of a snail is reproduction. Gonadal index (GI) is which express the relative change in gonad weight to the percentage of the body weight. The healthy and active snails were used for an experiment and GI was estimated. Results shows that GI was maximum in the month of November (0.548), December (0.518), and January (0.485) and minimum in the month of August (0.183) and April (0.198).

INTRODUCTION

The class Gastropoda is the largest group which comprises of shelled animals included in phylum Mollusca, along with other 4 classes (Ramakrishna *et al.,* 2014). Gastropoda comprises of three classes-Prosobranchia, Opisthobranchia and Pulmonata. The Prosobranch snail, *Bellamya dissimilis* is selected as a model as these snails are abundantly available throughout the year in freshwater bodies. A number of studies have been carried out on the pesticide toxicity in aquatic gastropods. (Ramana Rao and Ramamurthi, 1978; Muley and Mane, 1989; Magare, 1991; Chaudhari and Lomte, 1992, Jadhav *et. al*., 1995; Lomte and Waykar, 2000; Ahirrao *et al*., 2004; Ahirrrao and Kulkarni, 2005; Ahirrao and Khedkar, 2012; Ahirrao and Borale, 2013 And Borale and Ahirrao, 2013. But different parameters like organ indices, reproductive index; shell index and water percentage in the body of snail is studied by very few workers. The study was undertaken with the aim to see the seasonal variations in gonadal index in *Bellamya dissimilis.* The analysis of gonadal index values which provide a measure of gonad size relative to body weight (wootten 1991) can provide a quantitative assessment of the degree of gonadal development, the breeding season and the reproductive cycle (Gutiérrez-Estrada *et al.,* 2000). The reproductive potential, resistance, survival abilities, feeding habits and most of the peculiarities are depending on the presence or absence of the body fluids, proportions of organs and organ index in the body of animal. Gonadal index (GI) is which express the relative change in gonad weight to the percentage of the body weight.

MATERIALS AND METHODS

The Godavari River near Kaygaon toka, Pravara Sangam, Aurangabad, which is located at latitude 19˚37'57.44" N and longitude 75˚14'30.41"E inhabit *B. dissimilis*. The active and healthy snails, *B.dissimilis* were collected from Godavari river for each month from June -2016 to May -2017. Animals were brought to the labroratory.

Every month about 20 snails were selected and shells were removed and the total body of snails were weighed and then snails gonads were dissected out and that was also weighed.

Later percentage of gonad weight in relation to the total body weight was calculated by using the following formula,

$$\text{Gonadal index} = \frac{\text{Weight of gonads}}{\text{Total weight of body}} \times 100$$

RESULTS AND DISCUSSION

About 20 snails every month were used. A monthly variation in Gonadal index of *B.dissimilis* during the study period is reported in table1 and is expressed in as percentages. The Gonadal index (GI) of *B.dissimilis* was found maximum in the month of November (0.548), December (0.518), and January

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(0.485). After January it decreased gradually up to the month of April (0.198). This change may be due to the synthesis and secretions of the sex cells and materials. Hence in the post reproductive period the gonad index has been declined significantly. It shows slight variations throughout the whole year. The GI value during May, June, July were 0.468, 0.461, 0.458 respectively, after which the values decreased slowly in month February (0.389), then in September (0.308) and March (0.303).After which the values decreased slowly reaching to minimum in the month October, April, August (0.269), (0.198) and (0.183) respectively.

Neuroendocrine hormones play an important role in the reproduction. As the brain is the main organ of the body, so neurohormones secreted during the pre-reproductive, reproductive and post-reproductive periods. So we found slight variations in gonadal index. The reproductive system of gastropods are very much complicated and hence it is known the neurosecretary cells control all the physiological processes like reproduction and they create an imbalance in the normal system (Utkar, 1982). Lot many literatures are available on the relationship between neurosecretion and reproduction in mollusc. (Gabe 1984) was the first to study neurosecretary activities and which he correlated with the body indices and the reproduction. Neurohormones are secreated in the reproductive period as studied by Magare 2000.

In the studies of Ahirrao K.D 2014 they also showed similar results as compared to our results, their GI of snail *Thiara Lineata* was found Maximum in the month of November and December(1.4).

Mantale, 2008 showed slight variations in the gonadal index of their species *I. exustus* Their GI was increased in July and was greater upto the October and at the starting of June gonads continued a large no. of previtellogenic and early vitellogenic oocytes. They concluded that *I. exustus* get matured upto early June and follow high reproductive activity on the onset of rainy season.

During the study, it has been found that the reproductive potential is maximum in the monsoon season, while it is suddenly decreased in winter(post reproductive period) and slowly increased (pre-reproductive period) in the summer which it reached to its maximum just before the onset of rainy season.

Table 1 Annual variations of Gonadal index in snail, *B.dissimilis*

Year	Months	Average wt. of Body(gms)	Average wt. of Gonads(gms)	GI%
	June	17.350	0.080	0.461
	July	15.280	0.070	0.458
	August	16.320	0.030	0.183
2016	September	16.220	0.050	0.308
	October	18.570	0.050	0.269
	November	18.220	0.100	0.548
	December	21.220	0.110	0.518
	January	20.610	0.100	0.485
	February	20.530	0.080	0.389
2017	March	16.470	0.050	0.303
	April	15.110	0.030	0.198
	May	21.360	0.100	0.468

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