GONADOSOMATIC INDEX OF A TERAPONID SPECIES, *TERAPON JARBUA* (FORSSKAL, 1775) (FAMILY: TERAPONIDAE) OF KARACHI COAST, PAKISTAN

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ABSTRACT

A study was conducted on gonadosomatic index (GSI) of a Teraponid species, *Terapon jarbua* collected from Karachi coast. The fish sampling was carried out from January 2013 to December 2014. A total of 676 specimens of *T. jarbua* were collected during the study period. The values of gonadosomatic index (GSI) for males ranged from 0.51 to 1.85 during 2013 and 0.47 to 1.61 during 2014 whereas the values of gonadosomatic index (GSI) for females ranged from 0.89 to 3.12 during 2013 and 0.90 to 3.86 during 2014. During the study, the higher values of gonadosomatic index were observed in April and July, showing one spawning season of *T. jarbua.*

Key-words: Teraponidae, *Terapon jarbua*, gonadosomatic index (GSI), maturity, Karachi coast.

INTRODUCTION

Fishes of the family Teraponidae are commonly known as "grunters" or "tiger perches". This family contains 16 genera and 48 species (Nelson, 2006). The three-striped tiger fish (*Terapon jarbua*) is a vertically striped species; mostly occur about 25 to 30 cm in total length. These are catadromous group of fishes, commonly found on shallow sandy bottom area near the river mouths at 20 to 350m depth (Froese and Pauly, 2015). Juveniles are found in sandy intertidal areas, most frequently in tidal pools (Pauly *et al.*, 1996). Adult fishes spawn in the sea and juveniles migrate into fresh water where they mature into adult stage (Allen, 1991). These fishes seem to spawn throughout the year and breed near inshore water of sea (Jeyaseelan, 1998).

The studies about the reproductive biology of fishes facilitate in fisheries and aquaculture practices (Amtyaz *et al.*, 2013). The Gonadosomatic index (GSI) is a tool for measuring the sexual maturity of fishes in relation to the gonadal development (Gaikwad *et al*., 2009). The higher values of Gonadosomatic index (GSI) indicate the maturity of gonads and the lower values denotes the spawning period of fish (Golikatte and Bhat, 2011). Gonadosomatic index (GSI) gives an overview about the maturity of gonads and periodicity of spawning as well as it helps to estimate the breeding season of fish (Alam & Pathak, 2010).

MATERIALS AND METHODS

Sample collection

Fishes were randomly sampled from the commercial landings at Karachi coast fish harbours (West Wharf and Korangi creek), during a period of January 2013 to December 2014.

Laboratory processing and Data collection

Fresh samples were analyzed in the laboratory. Fishes were measured and weighed to the nearest 0.1g. For the estimation of Gonadosomatic index (GSI), fishes were dissected from the abdominal region and gonads were removed carefully. Identification of sex was made by macroscopic examination of gonads. Gonads were also weighed to the nearest 0.1g by an electronic balance. The values of Gonadosomatic index (GSI) was calculated with the help of following equation as proposed by Zin *et al.* (2011).

$$\text{Gonadosomatic Index (GSI)} = GW \times 100/BW$$

Where GW= gonad's weight (g); BW= fish body weight (g).

Statistical analysis of data

All statistical analysis was carried out with the help of MS Excel 2013.

RESULTS AND DISCUSSION

Gonadosomatic Index is a useful tool which helps in determining sexual maturity and spawning of fishes. It increases with the gonads maturation and falls after spawning activity (Rheman *et al.,* 2002; Gaikwad *et al.,* 2009). Hence, the result of the present study revealed the GSI values calculated during the whole study period was found to be highest in the months of April and July in *Terapon jarbua,* and confirmed that the maturation of gonads of *T. jarbua* starts from the month of April and spawning prolonged up to the month of August. The present study specifies that *T. jarbua* has only one spawning period as shown in Fig. 1-2, respectively.

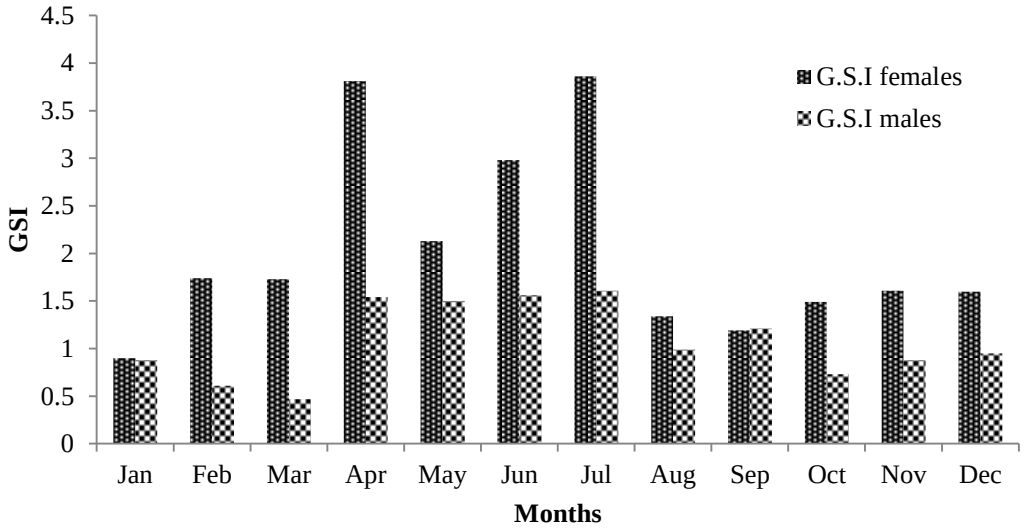

Fig. 1. Gonadosomatic index (GSI) of *Terapon jarbua* for the year 2013.

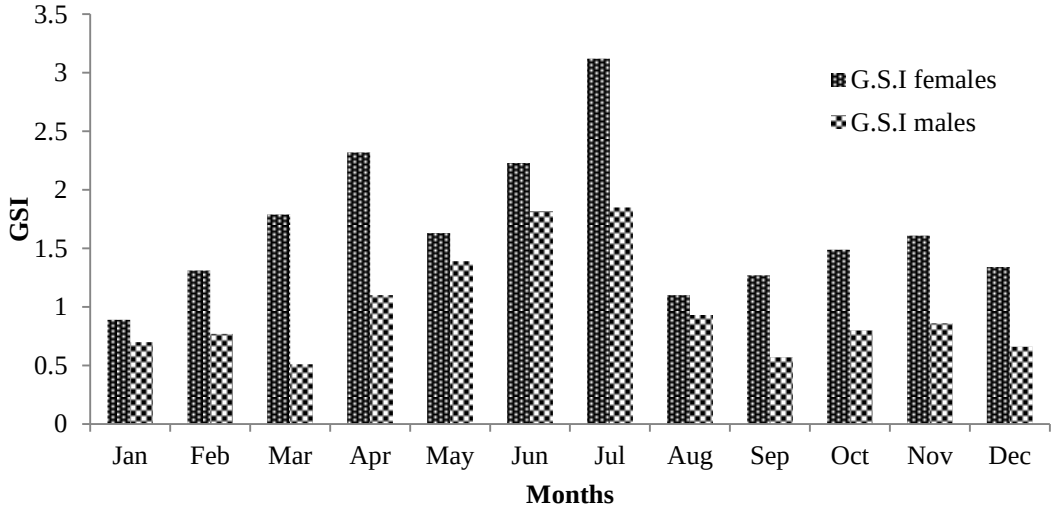

Fig. 2. Gonadosomatic index (GSI) of *Terapon jarbua* for the year 2014.

During January 2013 to December 2013, first rise in GSI value of female *T. jarbua* was observed in April (2.32) and drop in May (1.63) that specifies the beginning of spawning period. The second rise in GSI value was noted in the month of June (2.23) with peak in July (3.12), which shows the maturation in further fishes. The sudden drop in GSI value in the month of August (1.10) shows the spawning activity in fishes. The lower values of GSI in September (1.27), October (1.49), November (1.61) and December (1.34) showed the resting period in fishes. The

increase in GSI values seen after January shows the preparatory phase for the next spawning period in *T. jarbua.* Whereas, the higher GSI values for male *T. jarbua* were inspected during June (1.82) and July (1.85) which indicates that female *T. jarbua* get maturation earlier than males. Almost the same results were observed during January 2014 to December 2014 for *T. jarbua.* The first peak in GSI value of female *T. jarbua* in the year 2014 were investigated during April (3.81) which designates the maturation in fishes. A drop in GSI value were observed in the month of May (2.13) which illustrates the start of spawning activity. Again rise were observed in GSI values during June (2.98) with peak value during July (3.86) shows the maturation in other fraction of fishes. The higher values of GSI in male *T. jarbua* were observed during June (1.56) and July (1.61). Hence the results of present study shows that the maturation and spawning activities in *T. jarbua* starts from April and prolonged up to the August with two major peaks in April and July. However, Nandikeswari *et al*. (2014) also reported one spawning period for *T. jarbua* that is from February to July on Indian coast.

As gonadosomatic index (GSI) shows the maturity of fish and indicate the spawning period. Several scientists had estimated the gonadosomatic index (GSI) for the different species of fishes in order to recognize their sexual maturation as well as the spawning period. Alam and Pathak (2010) observed the highest GSI value for *Labeo rohita* in the month of August, and consider it as spawning season of this species. On the basis of gonadosomatic index, Golikatte and Bhat (2011) divide the breeding season of *Gerres filamentous* into three periods *i.e.* Pre-spawning, Spawning and Post spawning periods and observed the peak value of gonadosomatic index in the month of June indicating only one spawning period. Guclu and Kucuk (2011) observed spawning period of *Aphanius mento* between May to July. Ghanbahadur *et al.* (2013) also found one spawning period in *Channa gachua* that is June to August with peak GSI in the month of May. They have been divided spawning period of *Channa gachua* into four periods. According to them, increase in GSI during March to May specifies the pre-spawning period, slowly declines in GSI from June to August shows the spawning period then sharply falls in GSI from September to November indicates the post spawning period and progressively increase in GSI during December to February designates the preparatory phase in *Channa gachua.*

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