

Population structure and temporal variation in the gonadal development in the population of *Meretrix casta* (Family: Veneroidae) from Sonmiani, in Pakistan.

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The temporal variation, sex-ratios, size-frequency in gonadal development and spawning season, of *Meretrix casta* var. ovum from Sonmiani were studied. The overall sex-ratio in *M. casta* was slightly in favor of females. In eight months of the sampling period sex-ratio was close to expected 1:1 theoretical ratio. In October, December 2004, February and April 2005 significant departure from the expected 1:1 ratio was observed in favor of females. The females dominated in October 2004, February and April 2005. Males were abundant in the month of November and December 2004. The gonadal development in males and females takes place throughout the year without any resting period. The high frequency of developing females in the population was recorded in the months of July and August 2004. The ripe females were encountered in eight months of the sampling period, major peak recorded in January 2005. The females were spawning more frequent during September to November 2004 period. The major peak of ripe males was recorded in August 2004. The highest percentage of resorbing females was observed in July 2004 followed by March and the lowest was found in May while the resorbing males were present throughout the study period except in June, December 2004 and in April 2005. The spawning season in females was observed throughout the year except, August 2004 and April 2005. The peak of spawning in females was recorded in October 2004. The spawning in males was noted all in ten months of the year except, November and December 2004. The peak of Gonadal index was recorded in September and October-04, while its lowest value was recorded in December-04.

[Keywords: sex ratios, size-frequency, gonad development, spawning season]

INTRODUCTION

The genus *Meretrix* of the family Veneroidae is widely distributed throughout the world and many species of this family including *M. Meretrix*, *M. casta*, *M. planisulcata*, and *M. lyrata* have gained economic value (Yoosukh and Matsukuma 2001). Clams vary in size, shape, and color, but still have high nutritional content. Clam aquaculture is the most valuable shellfish in the aquaculture sector. Extensive studies on the biology on a number of species of clams have been conducted in the temperate and tropical waters around the world (Lomovasky et al. 2005; Ryu et al. 2006; Chung 2007; Srilatha et al., 2015).

Among shellfish the clams are considered more important than the oysters at Mumbai coast (Hornell 1916). These are regularly fished from the creeks, estuaries and backwaters of India as their meat is used as food and their shells are utilized in making lime. (Boominathan et al. 2008; Rai 1932) reported genus *M. casta* as one of the most exported food items on the Chennai coast. In the tropical waters of the southwest and southeast coast of India species of clams *M. casta* are commercially exploited and have been utilized as food (Jayabal and Kalyani 1986 a, b;

Sujah and Mutiah 2007) *M. casta*'s reproductive biology and fisheries have been studied (Narasimham et al., 1988; Thangavelu and Poovannan, 1994), as well as the shell dimensional relationship (Durve et al., 1965) and experimental transplanting. Other edible clam species examined from the Indian coast include *Donax cuneatus* and *D. faba* (Nayar 1955; Alagaraswami 1966; Rao 1967), *Katelysia opima* (*Marcia opima*) (Nagabhushanam and Mane 1975; Kalyanasundaram 1982), and *Solen kemp* (Rao et al. 1962). Recently comparative study of reproductive biology and larval rearing of baby clam *Marcia opima* (*Katelysia opima*) have been reported from Tuticorin Bay, Tamil Nadu on Southeast coast of peninsular India and Ashtamudi estuary, Kerala in the Southwest (Muthiah et al. 2002; Suja and Muthiah 2007), Another species *Gafrarium tumidum* was studied for reproductive biology and larval rearing from Mandapam, Camp, Tamil Nadu, India (Jagadis and Rajagopal 2007).

Many creeks, backwaters, and lagoons along Pakistan's coast also harbor a variety of species of clams that are of commercial interest, particularly, *Marcia cor*, *Tivela pondorosa*, *Meretrix tumida*, *M. meretrix*, *M. casta*, *M. casta* var. ovum, *Linconcn* *picta*, *Circe scripta* *Hemitapes pinguis*, *Phaphia*