

Acanthopagrus berda - a potential species for mariculture in India

M. T. Shilta^{*1}, P. P. Suresh Babu¹, K. Vinod¹, P. K. Asokan¹, Imelda Joseph² and Ramya Abhijith¹

¹Calicut Research Centre of ICAR-Central Marine Fisheries Research Institute, Kozhikode - 673 005, Kerala

²ICAR-Central Marine Fisheries Research Institute, Kochi - 682 018, Kerala

*E-mail: shiltathomas@gmail.com

Sea breams belonging to the sparidae family are excellent food fishes and important candidate species for aquaculture. Globally, the river bream, *Acanthopagrus berda* is highly valued in commercial fisheries and aquaculture due to their excellent meat quality, market demand, easy adaptability to captivity and ability to tolerate wide variations in both salinity and temperature. *A. berda* is distributed in the estuarine and shallow coastal waters of Kerala, Tamil Nadu, Andhra Pradesh, Maharashtra and Gujarat coasts (Fig.1). Locally known as "Karuthaeri" along Kerala coast they are fished by artisanal fishers using cast nets and hook & line and fetch ₹ 400-500 per kg in the domestic markets. At present, India is looking for native food fishes for mariculture development and *A. berda* is considered as a priority species due to their high market demand.

To acclimatize the wild brood fish of *A. berda* to captivity and to develop protocols for inducing consistent multiple spawning, studies on its biology is a prerequisite. Only limited information of the biology of *A. berda* from Indian waters being available, biological aspects of the fish collected from the Korapuzha estuary in Kozhikode, Kerala was studied in detail.

Fishes examined were having total length ranging from 125 to 438 mm and total weight ranging from 34-1753 g. The growth pattern of *A. berda* was found to be isometric ($b = 3.06$) indicating that the fish increases in length and weight at the same rate. They were omnivores, feeding mainly on barnacles, crabs, *Modiolus* spp. and oysters. Studies on its reproductive biology indicated digynous protandrous hermaphroditism (most of the individuals function first as males and then change sex to female, but few continue to function as males and females throughout their lifespan). The males were observed dominant in smaller length classes (130-250 mm total length) whereas females (250-450 mm total length) were observed dominant in larger length classes. Their reproductive cycle consists of resting phase, lasting from February to July; pre-spawning phase, occurring from March to August and spawning phase from August to December in Korapuzha estuary. Based on the morphological and histological studies of the gonads, the ovotestes of *A. berda* were classified as given in Table 1 and shown in Fig. 2.

The simultaneous availability of both running males and females during spawning season indicated the opportunity for development of captive breeding protocols

Table 1. Histology based staging of gonads in *A. berda*

Stage	Gonad histology
Immature ovotestes	Testicular lobe containing spermatogenic cells and ovarian lobes with inactive oocytes of the chromatin nucleolar and perinucleolar stages
Inactive male	Testicular portion is characterized by spermatogonia with lesser spermatogenic activity and the ovarian portion contains the oocytes of chromatin nucleolar and perinucleolar stage with further development arrested
Active male	Tubule space and interior lumen of testicular portion dominated with spermatocytes, spermatids and spermatozoa and ovarian lobes with oocytes in chromatin nucleolar and perinucleolar stages
Active female	Ovotestes with large number of advanced vitellogenic oocytes with some previtellogenic oocytes
Inactive female	ovarian lobe with oocytes of chromatin nucleolar and perinucleolar oocytes and remnants of testis appeared with no spermatogenic activity
Transitional ovotestes	signs of degeneration in the testicular lobe, the proliferation of connective tissue and empty sperm ducts and the ovarian lobes were characterized by oocytes of chromatin nucleolar and perinucleolar stages

for *A. berda*. Broodstock collected during the spawning season were reared in captivity and fed with fresh oyster and squid meat @ 5% of their body weight. Active males were easily identified with free-flowing milt on slight abdominal pressure and active females with bulged abdomen and red colouration around the vent. They were successfully induced to spawn employing commercial inducing agent WOVA-FH and fertilized eggs were obtained at the Marine Hatchery Complex. The intra-peritoneal injection of WOVA-FH made hand stripping from *A. berda* brooders followed by artificial fertilization possible which confirms the possibility of successful captive breeding programmes for this species.



Fig.1. *Acanthopagrus berda* collected from Korapuzha estuary

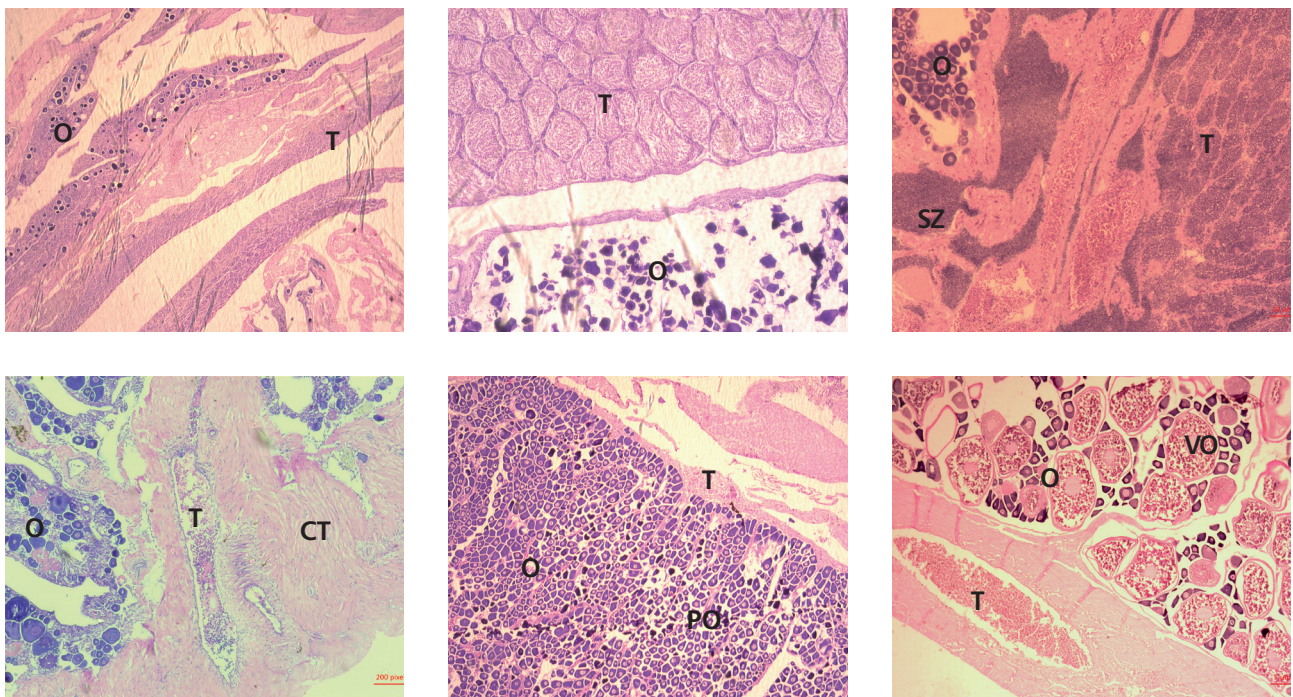


Fig.2. Classification of ovotestes of *A.berda* based on histological parameters. From left to right (a) Immature ovotestes (b) Inactive male (c) Active male (d) Transitional (e) Inactive female (f) Active female

(T-testis, O- ovary, CT- connective tissue, SZ- spermatozoa, PO-Perinucleolar oocyte, VO-Vitellogenic oocyte)