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Collection, Transport and Maintenance of Asian Seabass *Lates Calcarifer* (Bloch)

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Abstract

This paper deals with the collection, transport and maintenance of live seabass, *Lates Calcarifer* from the wild in Gulf of Mannar and Palk Bay region during April, 1990 - March, 1994. Preliminary surveys have revealed that most of the specimens collected from the wild were immature and maturing males throughout the year. This species has been found to be protandrous hermaphrodite and the size around with the males undergo sex change in the natural habitat has been studied. Forage fishes freshly killed sardines and formulated feed was given to the broodstocks during maintenance in concrete tanks and netcages in the sea. Broodstocks were administered with steroid hormones (β estradiol - β diol) and human chorionic gonadotrophin @ 250 μ g and 50 I.U./Kg body weight respectively at 60 days intervals for the acceleration of gonadal maturation. Gonadal development of the broodstocks was monitored through live biopsy at 90 days intervals.

Introduction

Seabass or giant perch, *Lates calcarifer* is as important commercial food fish with promising aquaculture potential (Cheong and Yeng, 1987). In India, it is distributed along the east and west coasts but is more common in Bengal region where it is cultured in ponds, canals, bheries and paddy fields (James and Marichamy, 1987).

The collection, transport and management of seabass for achieving artificial propagation of seabass from the wild and captive broodstocks were accomplished earlier by various worker (Bhatia and Kunguvankij, 1971; Wongsomnuk and Maneevonk, 1983; Dhebtaranon *et al.*, 1979; Anon, 1987, Kunguvankij, 1987). Results of recent studies on the collection, transport and maintenance of seabass are presented here.

Materials and Methods

Survey on broodstocks availability

A preliminary survey on the availability of broodstocks of seabass at selected areas along the coastal water of Gulf of Mannar and Palk bay were carried out from April 1990-March 1994 (Fig. 1). Based on the survey, three centres namely Pamban and Mandapam in the Gulf of Mannar and Athankarai in Palk Bay were selected for the regular collection of live specimens. Generally, gill nets, cast nets, drag nets, shore-seines and Hook and lines were operated for catching the fishes.

Collection and transport of broodstocks

Live broodstocks of seabass were caught mostly from the wild. Immediately, after capturing the specimens, they were maintained in small net cages (size 1.0x0.75x0.75m) kept in the coastal waters for a period of 1-2 hours till transport. Further, small net cages (size 1.0x0.75x0.75m) were also fabricated to maintain the live broodstocks whenever caught. The live

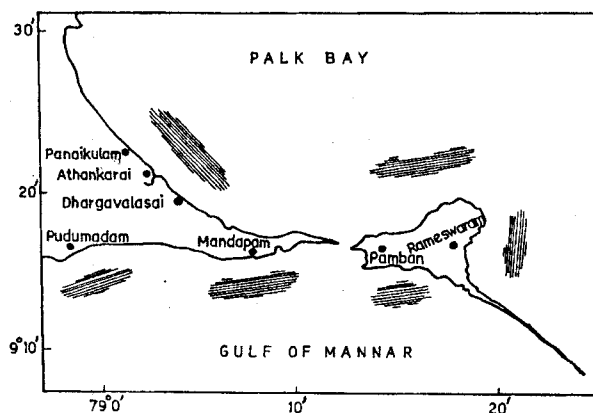


Fig. 1. Map showing the availability (shaded areas) of broodstocks of seabass along the coastal waters of Gulf of Mannar and Palk Bay Regions.

specimens were transported to the experimental site in large fibreglass tanks of 1 ton capacity with adequate changing of water and aeration with oxygencylinder. The specimens were given treatments with antibiotics such as acriflavin (10 ppm 1 hr), nitrofurazone (15 ppm-4hr) malachite green (10 ppm-1hr) and methylene blue (10ppm-1 hr) to cure the injuries and bacterial and viral infections caused during capture and handling stress. The live specimens were given dip treatments immediately after capture in solutions of potassium dichromate or potassium permanganate (1.6 ppm - 2hr) to prevent infection. They were reared in 50 ton capacity concrete tank (25Lx20Bx5.5D) with continuous flow seawater system. The exchange of seawater per day ranged from 70 to 100% in the rearing tank.

Results and Discussion

Collection and transport of broodstocks

Altogether 62 numbers of live broodstocks of seabass

(450-950mm/1.5-9.0 kg) were collected from the wild and maintained during the period from April 1990 - March 1994 (Table 1). Among them, 70% were males and 30% females. The length and weight of the specimens were ranged from 450-950 mm and 1.5-9.0 kg respectively. During maintenance, the live broodstocks were provided with live forage fishes such as milkfish, grey mullets and perches as well as freshly killed sardines as feed, since they began normal feeding only after 10 - 15 days. They show preference to live feed than frozen material. In addition to this, artificial formulated feed (fish meal + ricebran + fish oil + soyabean meal + tapioca powder + vitamin mix) were also given. The gonadal development of the live broodstocks was monitored through live biopsy once in three months. Among three live broodstocks collected from culture ponds, the largest one (800mm/6.0kg) was a post spawning male reversed to female. The ovidiameter ranged from 0.03-0.11 mm. The other two specimens were males (720mm/5.0kg; 740mm/5.5kg) in an immature condition. Further, two maturing males of the size 520mm/2.0 kg and 575mm/3.0 kg were reared in one fixed type net cage (size 2.25 Lx2.0 Bx1.5m D) with the mesh size of 30 mm, fabricated by 70mm diameter PVC pipes was erected with the support of casuarine poles in the nearshore water at Krushadi Island. The live specimens were administered with steroid hormone β estradiol -17 β diol and human chorionic gonadotrophin (HCG) at a dosage of 250 μ g/kg and 500 IU/kg body weight respectively. The administration of the above dosage of hormones was continued at 60 days of intervals for the advancement of gonadal maturation.

It may be revealed from the present study that most of the live seabass collected from the wild by using cast nets and gill nets were injured or even moribund state. Most of the specimens (90%) were not surviving during maintenance in the rearing system due to capture stress since they were caught in cast net and gill net operations. Live specimens collected from shore-seine and dragnets were survived better when compared to castnets and gill nets, operations. In Thailand, specimens are caught in natural spawning grounds near the mouth of the river and gill nets and seine nets are commonly used. (Ruangpanit, 1987). Further, broodstocks of seabass were raised from juvenile stage in netcages (Maneewong 1987; Kungvankij, 1987). In Indonesia, the spawners of the size of 3-14 kg were caught using a combination of shelter and gill net in coastal waters (Ismail and Danakusumah, 1987). In Malaysia, spawners were caught from coastal waters during breeding

season, which coincided with the raining season (Ali bin Awang, 1987). They were caught by bottom drift nets during new moon and full moon days. Grey (1987) reported that the positions of spawning grounds in Queensland, Australia, probably differ slightly from year to year depending on coastal salinities and the timing and duration of the breeding season vary between regions and river systems. The breeders of seabass were raised from fingerlings to sexual maturity in floating net cages in Singapore (Cheong and Yeng, 1987). In Philippines, fingerlings of seabass were collected from the wild and raised upto broodstocks in ponds (Fortes, 1987).

Maintenance of broodstocks

In the present study, live broodstocks collected from the wild were transported in 1 ton capacity fiberglass tank with aeration by Jeep attached with tailer similar to the methods adopted in other Southeast Asian countries. They were maintained in 50 ton capacity concrete tanks and fed with live leat fishes, and freshly killed trash fishes @ 5% of body weight. They were also provided with artificial formulated diet and live fishes. In seabass, sex change normally occurs when male fish are about 7 years old and 820 mm in length but is merely likely to be related to age rather than size in Queensland waters (Davis 1982). In the present observation also, change of male breeders to female at 800-860 mm in length which is agreeable with the above findings. Implantation of pelleted hormones LH-RH-a and their combination with 17-a methyl testosterone (100 μ g of each hormone/kg body weight (Anon, 1990) and LH-RH-a (125 μ g/kg) in combination with HCG (500 IU/kg) (Anon, 1992) and LH-RH-a (50-100 μ g/kg) at 15 to 45 days interval gave comparable effectiveness in the induction of gonadal maturation and spawning in seabass. In the present study male broodstocks of seabass administered with steroid hormone (β estradiol - 17 β diol at the rate of 250 μ g/kg) in combination with human chorionic gonadotrophin (at the rate of 500 IU/kg) accelerated the gonadal maturation. Hydrological conditions of the water such as temperature, salinity and dissolved oxygen during maintenance were monitored regularly.

It may be revealed from the present study that most of the specimens of seabass collected from the wild were predominantly males with maturity stages I-III throughout the year. Mature and ripe broodstocks of both sexes have not occurred even during spawning seasons, which is a major constraint in the present study. It clearly indicates that adults

Table 1. Broodstocks of seabass (*Lates calcarifer*) collected from wild/ culture stock during April, 1990 - March 1994

Year	No. of specimens		Length range (mm)		Weight range (Kg)		Stage of maturity	
	Male	Female	Male	Female	Male	Female	Male	Female
1990-1991	11	2*	500-890	720-865	2.0-6.0	5.0-7.5	I to Oozing	III-IV
1991-1992	10	9*	720-910	520-930	4.0-8.0	2.0-7.8	II to III	I-III
1992-1993	10	3	520-950	830-940	2.5-9.0	7.0-8.5	II-III	II-III
1993-1994	12	5	450-795	790-920	1.5-6.5	6.5-8.5	I-II	II-III

*One specimen during 1990-91 and two specimens during 1991-92 was post-spawned male, in transitional stage of sex change to secondary female.

migrate to deeper waters for gonadal maturation and the mature and ripe broodstocks moving to estuarine bar mouth areas for spawning.

In view of the protandrous nature of seabass, *Lates calcarifer*, there is need for an assessment of the availability of large size mature female broodstocks so as to protect the breeding stock and prevent over fishing. Monitoring of the size at which sexual change occur from males to females will be a useful management tool since the present limited data may not allow an assessment of this situation. It is suggested that broodstocks of seabass can be raised from fingerling stage in ponds and netcages by transporting the same from the available area. There is a need to evaluate the range of magnitude of the wild catch of seabass in and around Mandapam and to determine appropriate and effective biological and socioeconomic indices to manage wild and cultured stocks.

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