Collection of Juvenile Mullet Species from a Brackishwater Tidal Farm in Nigeria

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Abstract

The major constraint to the development of aquaculture in Nigeria has been the non-availability of fingerlings in required numbers of cultivable fish species. A specially designed trap to collect mullet juveniles during high tides was successful in collecting juveniles year-round. The collection was more successful during night spring tides than during neap tides or daytime collections. Thus, the use of traps, especially in the tidal zones, could provide a cost-effective method of stocking fish farms by collecting juveniles and seed from the natural environment.

Introduction

Interest in the development of aquaculture in Nigeria has been on the increase in recent years, but the major constraint for expansion has been the insufficient production of fingerlings of cultivable fish species.

The grey mullet species are catadromous. They are important to commercial fishery and are probably the most widely distributed in the world's coastal waters. The popularity of the mullet species in aquaculture is due to the high quality of its flesh, its extreme tolerance for a wide range of temperature and salinity, which is important for culture in intertidal ponds.

Mullets can be found in the Western part of Africa, from Sénégal to Angola. Ezenwa (1979) listed six species of mullets from Nigeria: *Liza falcipinnis, L. grandisquamis, L. dumerili, Mugil bananensis, M. monodi* and *M. curema*. Fagade and Olaniyan (1973) and King (1984) reported the presence of the six species in the Lagos lagoon and the Bonny river of the Niger Delta.

In Nigeria, and in Africa in general, stocking of ponds with mullets has always depended on the capture of fingerlings and juveniles from the natural waters. This paper describes a method for collecting mullet juveniles from nature for pond culture using a specially designed trap.

Method

A trap was constructed using mosquito netting of 1 mm mesh and wood frames (Fig. 1). The front and rear parts consisted of a square wooden frame. The rear frame was covered with a netlon mesh of 1 mm. A bag sewn from mosquito netting connected the front and rear frames.

The trap was constructed to fit into the grooves of the sluice gate leading into the main water channel of the farm. Wooden boards were used to close the gate up to a particular height before fitting the trap so that the water passed only through the trap during the rising tide.

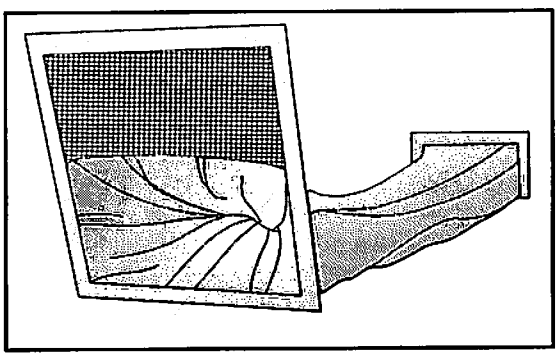

Fig. 1. Front view of a specially constructed trap used to collect mullet fry and juveniles from a natural water for use in pond culture.

Collections were made every two weeks from April 1992 to March 1993. The average of two collections in a particular month was regarded as the collection for that month. The mullets were then separated and identified following the descriptions of King (1984) and FAO (1990). Estimates of juveniles that could be collected in the farm area were also made.

Results

Two species, *L. falcipinnis* and *L. grandisquamis* comprised the mullets collected in the trap. The length of *L. falcipinnis* juveniles collected ranged from 3.4 to 15.7 cm (8.59±3.23) and the weight from 0.3 to 39.0 g (8.04±9.18); while for *L. grandisquamis*, the average length and weight were 0.4-14.0 cm (8.45±2.38) and 5-31.0 g (7.95±7.11), respectively.

The number and percentage composition of each mullet species collected during different months are presented in Table 1.

It was observed that a substantial number of mullet juveniles could be collected during peak periods of occurrence. If one considers the period from September to January (5 months) as the time of peak collection for *L. falcipinnis* and the number of days for collection per month to be at least 20, a conservative estimate of at least

Table 1. Number and percentage of mullet fry and juveniles collected during different months.

Month	All species No.	*L. falcipinnis* No.	*L. falcipinnis* %	*L. grandisquamis* No.	*L. grandisquamis* %
April 1992	97	46	47.42	31	31.96
May	110	60	54.54	28	25.54
June	144	13	9.03	96	66.67
July	128	20	15.62	51	39.84
August	109	21	19.27	13	11.93
September	250	76	30.40	9	3.60
October	163	91	55.82	8	4.91
November	260	982	88.31	15	1.35
December	1 112	174	66.92	6	2.31
January 1993	125	60	48.00	9	15.00
February	242	6	2.48	5	2.07
March	242	84	34.71	12	4.96
Total	2 982	1 633	54.76	282	9.46

27 000 juveniles could be collected during the period. For *L. grandisquamis*, with the months of peak collection from April to July (4 months), a relatively low number of about 4 000 juveniles could be collected. However, the seeds of both species occur year-round.

Discussion and Conclusion

The trap, as described, was successful in collecting mullet juveniles to stock the ponds during the period of the study. It was observed that the mullets remained alive and active when the trap was removed before the tide started to recede upon which they were immediately transferred to the ponds. Collections were greater during night time spring tides compared to the neap tides or daytime collections. The higher amplitude of the spring tide might have contributed to the greater number of mullets since it has been observed that euryhaline species such as *L. falcipinnis* are aided in their movement from marine to brackish and freshwater zones of the coastal waters by the influence of tidal waves (Ezenwa et al. 1990).

Although other species such as *Tilapia guineensis*, *Sarotherodon melanotheron*, gobiids, *Gerres* sp., the pink shrimp (*Penaeus notialis*) and the swimming crab (*Callinectes amicola*) were also caught, the record showed that the trap was most effective in collecting the mullets as they accounted for either half or more than half of the capture. These two species could be cultured along with other species in polyculture with the common carp (*Cyprinus carpio*), catfish (*Chrysichthys nigrodigitatus*) and the cichlids (Pillay 1965; Ezenwa 1973, 1977; Sivalingam 1975). Since juveniles of mullets are present in their natural environment during the peak season, the use of traps especially in the tidal zones could lead to a cost effective management of fish farms and reduce the cost of procuring and transporting seeds. However, too much extraction of mullet juveniles for culture could affect recruitment to the capture fisheries.

Ezenwa et al. (1990) have shown that approximately 80% of the breeding, nursery and schooling areas of the fish species within the flat muddy terrain and flood plains of estuaries, lagoons, creeks, coastal rivers and their tributaries are inaccessible to local fishers. Moreover, since the level of exploitation of mullet seeds with fishing traps in Nigeria varies from 20% in the Lagos area to 10% in the Delta and 5% in the Calabar areas of the coastline, the need therefore arises to intensify methods of harnessing the wild seeds.

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