



COMPARATIVE ANALYSIS OF OPERATIONAL PARAMETERS AND CATCH COMPOSITION OF 'PATTUVALA' AND 'VAANGUVALA' OPERATED IN THE CULTURE BASED FISHERIES IN VELLAYANI LAKE, THIRUVANANTHAPURAM

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Abstract: Vellayani Lake is the second largest freshwater lake in the state providing freshwater food fishes in addition to being a major drinking water source in Trivandrum District. Owing to the declining fish catches in the lake, Agency for Development of Aquaculture, Kerala (ADAK) introduced juveniles of non-native Indian Major Carps Catla (*Catla catla*) and Rohu (*Labeo rohita*) in the lake as a part of fish stock enhancement. The introduced fishes grew well in the conditions of the lake and started appearing in commercial catches within six months after stocking, resulting in a considerable increase in the capture production. The 150 odd fishermen depending on the lake for livelihood mostly operated gillnets (*Pattuvalla*) in the night. The increase in catch with large fishes motivated some of the fishermen to use locally designed encircling gill nets (*Vaanguvalla*) in the day time to increase the efficiency of operations. A comparative analysis of catch and operational parameters of *Pattuvalla* and *Vaanguvalla* were carried out by surveying the fishermen operating these gears in Vellayani Lake. Rohu forms the major catch in *Vaanguvalla* and catla was the major catch in *Pattuvalla*. The CPUE of *Pattuvalla* was very low compared to the *Vaanguvalla*. The average area of the webbing of *Pattuvalla* was 258.3sq.m and that of *Vaanguvalla* was 350 sq.m. The average catch of Rohu in *Vaanguvalla* was 10.49±0.77 Kg and the catch of catla in *Pattuvalla* was 3.31±0.27 Kg.

Key words: Gill net, Encircling gill net, Fish stock enhancement.

INTRODUCTION

Vellayani Lake, the second largest freshwater lake in Kerala is a major source of drinking water as well as freshwater fishes in the Trivandrum District. About 150 inland fishermen depend on the lake for their livelihood, fishing on traditional crafts (odam) using gill nets and cast nets. Pearlspot (*Etroplus suratensis*), *Clarias batrachus*, *Channa* spp., *Heteropneustes fossilis*, *Etroplus maculatus*, *Oreochromis mossambicus*, *Puntius* spp. and freshwater prawns *Macrobrachium rosenbergii* and *M. Idella* are indigenous to the lake (Bijukumar and Pramod Kiran, 2013). Of these pearlspot, cyprinids and freshwater prawns contributed to major catches.

As part of a fish stock enhancement programme, the Agency for Development of Aquaculture, Kerala (ADAK) under the Dept. of Fisheries, Govt. of Kerala stocked the lake with Indian Major Carps, Catla (*Catla catla*) and Rohu (*Labeo rohita*), a surface feeder and a column feeder, respectively, to utilize the productivity of the ecological niches (Liji Gopal, 2010). The two introduced species, which are not natural inhabitants of the lake, showed good growth rate and started appearing in catches within six months after stocking which, considerably increased the fish landings from lake (Viswanathan, 2010 and Sajid, 2012). The

Catch composition of 'pattuvala' and 'vaanguvala'

introduced fishes attained about one kilogram weight at the time of recruitment which was much larger than the naturally available species in the lake. Most of the fishermen used gill nets locally called "Pattuvala" in the night for fishing. To increase the efficiency of the fishing operations few enterprising fishermen introduced encircling gillnets locally called as "Vaanguvala" operated in the day time (Pramod Kiran *et al.*, 2013). Both the gears used in the lake are of traditional origin and indigenous design. The present study attempts to document a comparative analysis of catch and operational parameters of *Pattuvala* and *Vaanguvala* by surveying the fishermen operating these gears in the Lake.

MATERIALS AND METHODS

Location

Vellayani Lake is a major source of drinking water as well as freshwater fishes in the Trivandrum District (8° 24' 09"-8° 26'30"N and 76° 59'08"-76° 59'47"E). Lake has a length of 3.15 km with a width of 1000 m. The depth of the lake varies from 2 - 6 m.

Data collection and analysis

The catch details were collected bimonthly for a period of 19 months from September 2010 to March 2012. Six nets from each type were surveyed with the help of a questionnaire prepared specifically for the purpose. The questions were intended to collect operational details, catch and characteristics of the gear material. The collected data was analysed using SPSS.

RESULTS AND DISCUSSION

The survey showed that *Vaanguvala* and *Pattuvala* are the major traditional fishing gears used in the lake contributing to the bulk of the catches. *Vaanguvala*, an encircling gill net, is being used intensively after Indian major carps started contributing to catches (Athira, 2011).

Dimensions of the net

The mean length of *Vaanguvala* was found to be 62.5±9.3 m and the average weight was 22.3±5.8 Kg. In case of *Pattuvala* the mean length was

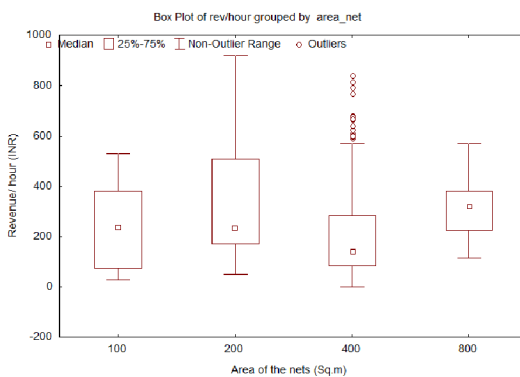


Fig. 1.

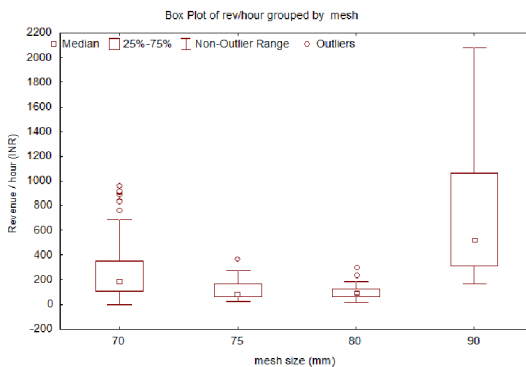


Fig. 2.

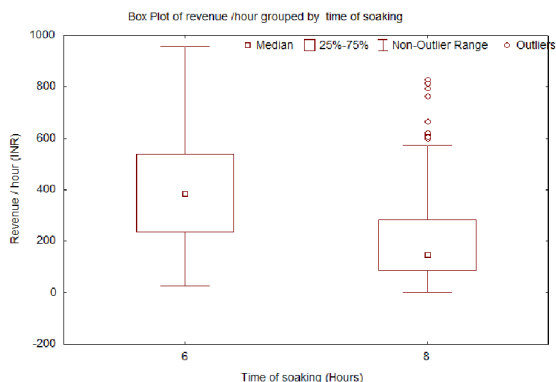


Fig. 3.

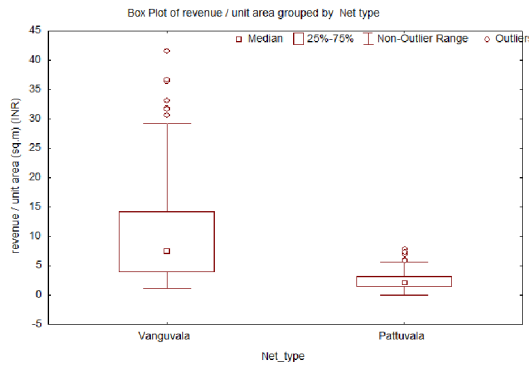


Fig. 4.

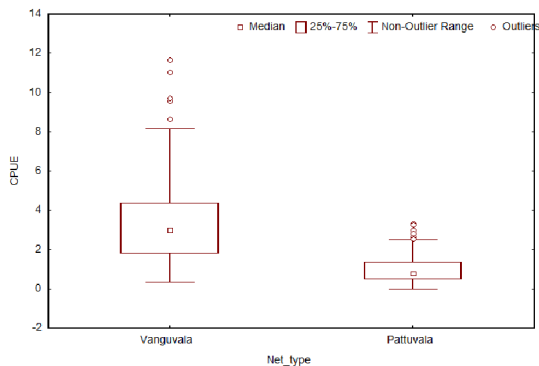


Fig. 5.

516±100 m and average weight was 21.6±8.5 Kg. The mesh size of *Vaanguvala* ranged from 40-90 mm that in *Pattuvala* ranged from 70-80 mm, however, the most common mesh size for both the nets was observed to be 70 mm. The material used for the fabrication *Vaanguvala* of the net is polyamide (with a diameter of 1.0 mm). Polypropylene ropes with a diameter of 4 mm were used as the head rope. In *Pattuvala* the head rope was absent. The floats used in *Vaanguvala* made of PVC with a diameter of 50mm; but in *Pattuvala* the floats HDPE floats were used.

No sinkers were used in both nets. The average area of the webbing of *Pattuvala* was 258.3 sq.m and that of *Vaanguvala* was 350 sq. m.

Catch details

Vaanguvala mainly targets the large sized fishes like catla, rohu (above 1 kg), catfishes, murrels,

and pearlspot. *Pattuvala* contributing medium sized fishes like tilapia, eels, in addition to the above ones. Comparing the area of the meshes, the 200 sq.m webbing caught significantly higher catches than all other nets, however, the difference was not statistically significant (Fig. 1). Of the different mesh sizes used, 90 mm contributed to higher catches (Fig.2). The average catch from *Vaanguvala* for 7.1 hour duration was observed as 54.21±10.03 kg; in case of *Pattuvala* it is 4.8±1.2 kg for 12 hours of operation. Hours of operation showed statistically significant difference in revenue generation and six hour soaking gave highest revenue/hour to the fishermen (Fig. 3). The *Vaanguvala* showed higher catch rates compared to *Pattuvala* (Fig. 4&5). Occurrence of brooders of catfishes and pearlspot were reported by all the groups surveyed and one group reported berried prawns in the catch, which was occasional.

Operation of the gear

Vaanguvala is operated by 3-6 people in the day time between 7.00 am and 4.00 pm. The duration of operation ranged from 6-8 hours and the fishermen used local country craft (*odam*) for reaching site of operation. The operation began with the identification of ideal site (areas with lotus plants were preferred). Then the fishermen enter the water to fix the net around the area and scare the fishes by agitating water. The scared fishes in the melee get gilled in the net. *Vaanguvala* is operated only once in a day.

Pattuvala was operated by 1-2 people in night time. It is a 12 hour operation and *odam* is used for reaching the site. The fishermen fix the net in the evening time between 4.00 pm to 7.00 pm. They return in the early morning between 5.00 am to 7.00 am to collect the gilled fishes. *Pattuvala* is also operated only once in a day.

The cost involved included the price of the nets, its maintenance and wages of the personnel involved. In both cases the owners of the nets were always involved in the operation of the net. Most of the fish landed were sold to the fishermen co-operative society at a fixed price and hence there were no price fluctuations.

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However, since both the nets targeted introduced species, continued stocking of Indian major carp seeds is required for ensuring a sustainable fishery as both the species do not breed in lakes.

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