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Comparison of multifilament polyamide (PA) stringless (with fixed pockets) and multifilament polyamide (PA) stringed cast net operated in Dal Lake, Kashmir

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Abstract

The present study was conducted in the Dal lake of Kashmir using two types of cast net viz., polyamide (PA) multifilament stringless with fixed pockets and polyamide (PA) multifilament stringed cast net to assess the catch composition and length weight distribution of fishes caught in the nets and to compare their catching efficiency in this lake. The study was based on 50 operations by each type of gear. A total of 9 species of fishes were caught in the study period. It was observed that *Schizothorax labiatus* (20.7%), *Schizothorax niger* (17.7%) and *Cyprinus carpio communis* (12.2%) dominated the catches. The average number and weight of fish caught was 2 and 126 g in PA multifilament stringless with fixed pockets cast net.

Keywords: Cast net, stringless, stringed, Dal Lake, Kashmir

Introduction

The design and efficiency of traditional fishing gears draw strength from practical knowledge accrued over several generations which remain valid and effective even today. Cast net is an active fishing gear which can be operated in shallow waters or on open water where the lake is free of bottom obstructions. Capture of fish largely depends on the efficiency of throw and degree of opening of the entire circumference of the net. Cast net is the second most important fishing gear after gillnet and still continues to be an important component of the resource in the lake fishery (Seisay, 1998) [8]. On the basis of construction, two types of cast nets were observed: cast nets without string (stringless cast net with fixed pockets) and cast nets with strings (stringed cast net) Most common material used for cast net worldwide was (polyamide/ Nylon) multifilament of specification 210D ×1×2 but due to the better catching efficiency nylon monofilament replaced multifilament (Remesan *et al.*, 2018) [7]. Cast net operation can be carried out throughout the year and fishing during the day was more common than light fishing at night (Udolisa and Solarin, 1979) [9].

The state of Jammu and Kashmir is rich in aquatic resources ranging from ponds, pools, streams, wetlands, springs and rivers to the voluminous lakes in the plains and in the high altitudes. (Raina, 2002) [4]. The water bodies of Kashmir valley support a wide variety of indigenous and exotic fish species and have played a great role in the social, cultural and economic status of the valley. These water systems of the valley are a great resource of natural products like fish, fodder and a variety of economically important plants. The important water bodies of Kashmir include Dal, Wular, Manasbal, Anchar, Khushalsar, Malpursar, Nilnag, Alapathar, Loolgul, Badsar, Kishansar, Vishansar, Gadsar and Gangabal and River Jhelum. Dal Lake a Sub-Himalyan lake covers an area of 11.56 sq. km. The lake is surrounded by Zabarwan hills on three sides. The commercially important fish species of Dal Lake are *Cyprinus carpio communis* and *Cyprinus carpio specularis* which comprise 60-70% of the total catch. Both of these are exotic forms. The endemic ones are *Schizothorax niger*, *Schizothorax esocinus*, *Schizothorax micropogon* and *Schizothorax plagiostomus* (Zutshi and Vas, 1982) [10].

A comparison is made between stringless cast with fixed pockets and stringed cast net with respect to their catch efficiency in Dal Lake of Kashmir in this communication.

Materials and Methods

Study Area

The Dal Lake is an urban lake that lies to the east of Srinagar city, at the foot of Zabarwan Hills, and is situated at an average elevation of 1,583 m (5,194 ft) above sea level with a maximum depth of 6 m (20 ft).

Details of experimental cast nets

The detailed characteristics of the two cast nets were: (i) PA multifilament stringless cast net with fixed pockets: these pockets are fixed by turning up the lower edge of the net and fastening it by short lengths of twine, forming a cast net with fixed pockets; (Fig1) (ii) in case of the PA multifilament stringed cast net, the strings can be connected individually to the lead line or each string can end with three tie cords as

shown in Fig (2). Stringless cast nets with fixed pockets and stringed cast net were fabricated with PA multifilament 210D×1×2 twine. During the hauling of the central line, pockets are formed to retain the catch. The mesh size of two cast nets was 30 mm.

Experimental layout

Catch composition and catch efficiency of two types of cast net was studied by conducting 50 operations with a total of 100 operations in Dal lake of Kashmir. Catch details were collected from each cast net viz., species wise, total length and weight of fish. The collected catch were transported to the laboratory. The length (in centimeter) of the fishes (total length) and weight of the fishes (in grams) were later recorded.

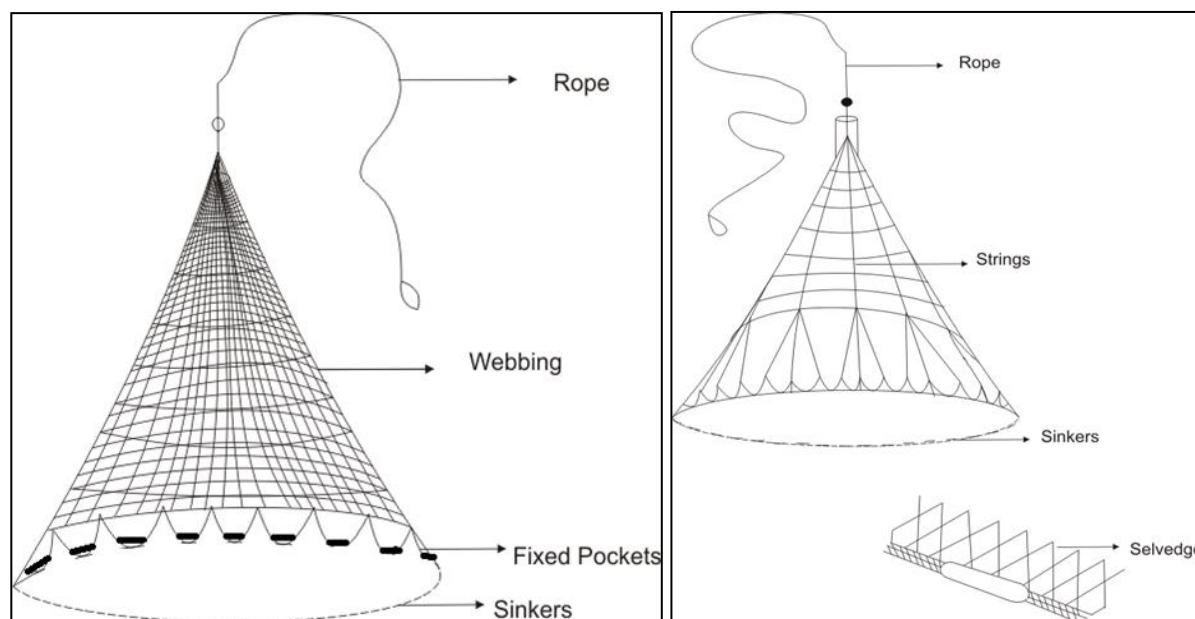


Fig 1: Diagrammatically represent the multifilament stringless cast net with fixed pockets

Results and Discussion

Total catch from both the cast nets included 236 individuals of 09 fish species. *Schizothorax labiatus* (20.7%) dominated the catches followed by *Schizothorax niger* (17.7%) and *Cyprinus carpio communis* (12.2%). (Mudassir *et al.*, 2019) [1] has reported that *Schizothorax labiatus* (locally named as *Chuss*) contributed 39.4% of the total catch followed by *Schizothorax niger* (locally named as *Ale Gaad*) (39.1%), *Schizothorax esocinus* (locally named as *Chhurru*) contributed 15.2% and *Schizothorax curviformis* (locally named as *Satter Gad*) contributed only 6.1% in Dal lake of Kashmir.

PA multifilament stringless (with fixed pockets) cast net

After completing the 50 operations, a total of 123 fishes were caught in which *Schizothorax labiatus* (21.9%) contributed the highest followed by *Schizothorax niger* (18.6%) *Cyprinus carpio specularis* (17.8%) as given in Table 1 and Fig 3. In terms of weight *Schizothorax labiatus* was dominant followed by *Cyprinus carpio specularis*. The average number and weight of fish caught was 2.00 and 126.76 g in PA multifilament stringless with fixed pockets cast net. Fish length ranged from 9.2cm to 27.5 cm in total length among which *Crosscheilus diplocheilus* was smallest in size and *Schizothorax niger* was the largest in size among the fishes

caught in PA multifilament stringless with fixed pockets cast net as given in Table 2. Similarly (Mudassir *et al.*, 2019) [1] reported that the smallest size of fish caught was *schizothorax niger* of 11.9 cm whereas the highest was *S. labiatus* in stringless monofilament cast net. (Emmanuel *et al.*, 2008) [2] reported that the smallest size of 5.1 cm was recorded in *S. melanotheron* in tropical open lagoon of Nigeria. The details of the length weight distribution of fishes are given in Table 2. Highest number of fish caught per operation was 10 out of the 50 operations. In the present study no catch was recorded in 12 times out of the total 50 operations. Average number of fish caught per hour was 15 in PA multifilament stringless cast net with fixed pockets. The total percentage of catch from PA multifilament stringless cast net with fixed pockets was 52.1% as given in Fig 5.

PA multifilament stringed cast net

A total of 113 fishes were caught in this net from 50 operations in which *Schizothorax labiatus* (19.4%) was the dominant catch followed by *Schizothorax niger* (16.8%) as given (Table 1 and Fig 4). *Schizothorax labiatus* contributed the highest by weight followed by *Cyprinus carpio specularis*. The average number and weight of fish caught was 2.0 and 123.65 g in PA multifilament stringed cast net. The smallest fish recorded was *Puntius conchonius* with

7.2cm and the largest size of fish was *Schizothorax esocinus* as given in Table 2. In present study average of number fish caught per hour was 11 in PA multifilament stringed cast net. (Emmanuel *et al.*, 2008) [2] reported that the average number of fish caught per hour was 39 in tropical open lagoon of Nigeria. The highest number of fish caught per operation was six from all the 50 operations. During the operation of PA multifilament stringed cast net no fish was caught from 16 operations and the total percentage of catch from stringed cast net was 47.8% as given in Fig 5. Based on the fish caught, the most dominant species was *Schizothorax species*. (Nimat *et al.*, 2016) [3] also has reported that the catch from cast net comprised mainly of *Cyprinus species* and *Schizothorax species* in Dal lake of Kashmir. Similar range of mesh size i.e. 30 mm for similar type of cast net was seen by (Emmanuel *et al.*, 2008) [2] in tropical open lagoon of Nigeria. Slightly higher

range of mesh size that of 40 to 50 mm and 50 to 60 mm was reported by (Ray, 2013) [5] from Sundarbans, Odisha and by (Remesan, 2009) [6] from north Kerala, respectively. Most common type of cast nets operated in Dal lake are stringless with fixed pockets. Stringed cast net was used for the first time in Dal lake of Kashmir during this experimental work. The percentage of catch was more in PA multifilament stringless with fixed pocket cast net than the PA multifilament stringed cast net. In Dal lake of Kashmir fishermen while operating stringed cast net was not familiar with the operation which required practice as it has quite different operation. The stringed cast net will have better catching efficiency in future than the stringless cast net with fixed pockets as and when the fishermen adopt this net and become familiar about this type of operation.

Table 1: Fishes caught from the PA multifilament stringless cast net and PA multifilament Stringed cast net in Dal lake of Kashmir

Species	PA multifilament stringless cast net (with fixed pockets)	Weight of fishes (kg)	PA multifilament Stringed cast net	Weight of fishes (kg)
	No. of fish caught		No. of fish caught	
<i>Schizothorax niger</i>	23	1.110	19	1.115
<i>Carassius</i>	11	0.510	11	0.520
<i>Schizothorax labiatus</i>	27	1.830	22	1.332
<i>Cyprinus carpio specularis</i>	22	1.114	----	----
<i>Cyprinus carpio communis</i>	13	0.900	16	1.300
<i>Crosscheilus diplocheilus</i>	12	0.102	14	0.108
<i>Schizothorax esocinus</i>	15	0.790	12	0.992
<i>Schizothorax curviforms</i>	----	----	11	0.752
<i>Puntius conchoniis</i>	----	----	08	0.070

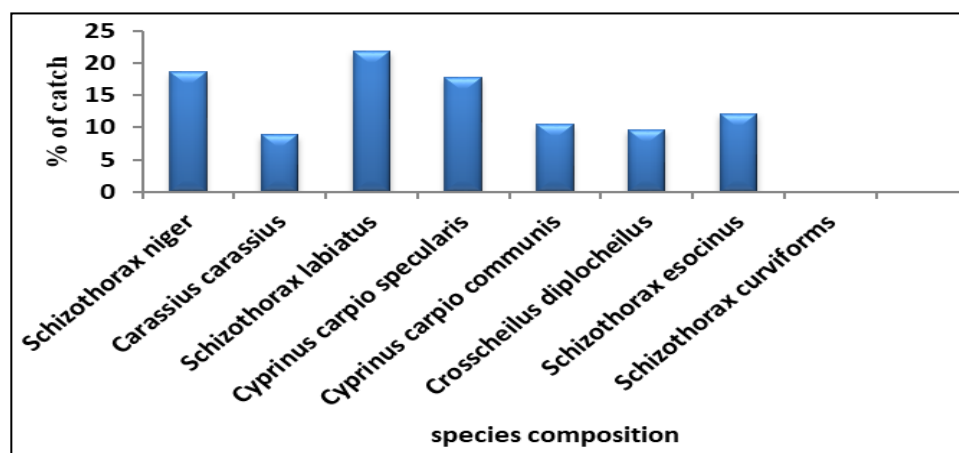


Fig 3: Percentage of fishes caught from PA multifilament stringless with fixed pockets cast net in Dal lake of Kashmir

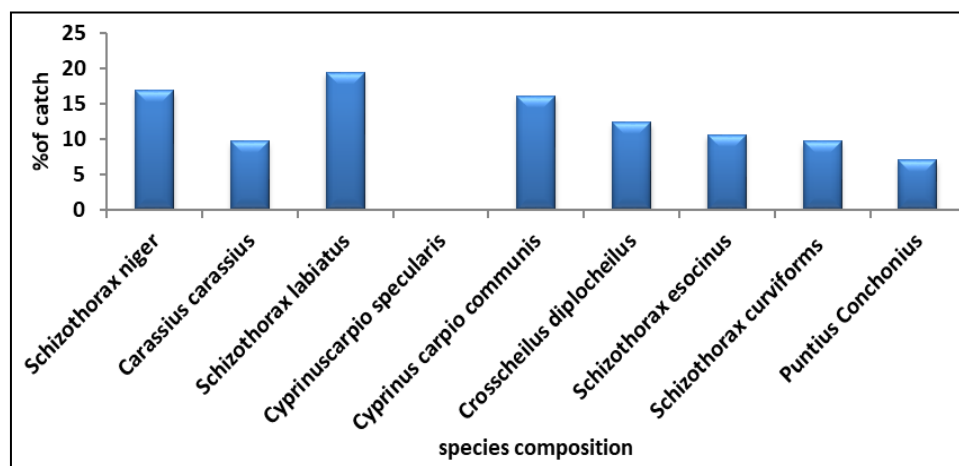


Fig 4: Percentage of fishes caught from PA multifilament stringed cast net in Dal lake of Kashmir

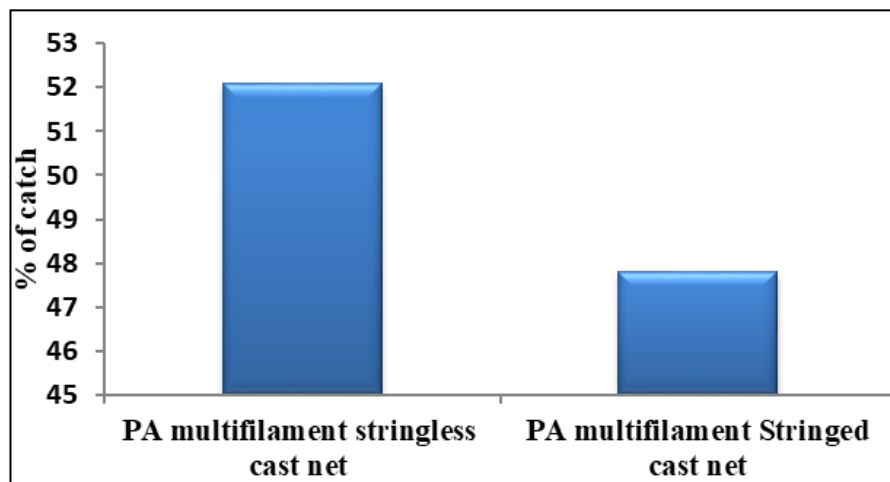


Fig 5: Total percentage of catch from two types of cast net

Table 2: Length and weight distribution of fishes from PA multifilament stringless (with fixed pockets) and PA stringed cast net

Species	PA multifilament stringless (with fixed pockets)		PA stringed cast net	
	Length range (cm)	Weight (g)	Length range (cm)	Weight (g)
<i>Schizothorax niger</i>	12.2-27.5	18.4-270	14.1-26.9	20.1-190
<i>Carassius carassius</i>	11.6-14.1	15.2-48.2	8.9-15.0	9.8-80.7
<i>Schizothorax labiatus</i>	12.9-24.6	20-210	11.5-25.2	10-195.6
<i>Cyprinus carpio specularis</i>	13.1-25.8	55.2-230	----	----
<i>Cyprinus carpio communis</i>	14.4-25.6	52.1-226	10.2-26.1	25.1-230
<i>Crosscheilus diplocheilus</i>	9.2-13.6	8.3-18.5	10.3-13.9	9.5- 18.6
<i>Schizothorax esocinus</i>	12.2-24.6	10-178.2	14.5-27.8	20.5-180.6
<i>Schizothorax curviformis</i>	----	----	11.3-23.3	18.2-150
<i>Puntius Conchoniuis</i>	----	----	7.2-13.8	9-70

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