ON THE FISHING POWER OF MONOFILAMENT AND MULTIFILAMENT GILL NETS

A. A. KHAN, N. A. GEORGE & O. P. PANDEY
Central Institute of Fisheries Technology, Nangal, India

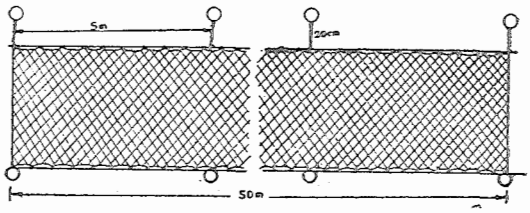
The authors have discussed the results of comparative fishing, conducted in the Govindsagar reservoir, with simple mmonofilament and multifilament gill nets. The experiments were conducted both in clear and turbid water. In both these water masses, the monofilament gill net has been found to be more efficient. It is also found that the four major species of fishes of the reservoir have not shown any preference towards a specific gear.

INTRODUCTION

Efficiency of gill nets is largely influenced by the behaviour of fish in relation to the visibility of the gear, which in turn is related to the type of materials selected for its fabrication (Parrish, 1959). The fishing power of gill nets of multifilament synthetic twines over nets of natural fibres, which are more visible in water, has been discussed by Nomura (1959), Saetersdal (1959), Mugas (1959), Molin (1959), Klust (1959), Amano (1959), Ako-Hyogoken (1959), Januz Zaucha (1963), Shimozaki (1963), Mathai and George (1972). All of them confirm that, multifilament synthetic gill nets are comparatively more efficient.

Though efficiency and suitability of monofilament twine against multifilament twine as a fishing gear material are still controversial, Molin *(op. cit.)* found monofilament gill nets as seven times more efficient than cotton and four times than multifilament nylon twine nets. Shimozaki *(op. cit.)* noted that monofilament gill nets are 1.2 to 3.3 times more efficient than nets of other materials. Tran-Van-Tri and Ha-Khac-Chu (1963) have illustrated the preference shown by North Vietnamese fishermen for monofilament gill nets against the multifilament ones. Steinberg (1963), while describing the fishing experiments with monofilament gill nets in freshwater, stressed the need for having nets of materials with low visibility and he has confirmed that monofilament gill nets have better efficiency over the multifilament ones. Einsels (1957), Wigutoff (1951), Henstead and Ede (1963) have all discussed the efficiency of monofilament twine as a fishing gear material. However, Blaxter *et al.* (1963) while studying the reaction of herring to stationary nets mentioned that monofilament nylon was almost completely ineffective

Text Fig. 1 Design and Construction details of the monofilament and multifilament gill nets.



Specification of the gill net compared.

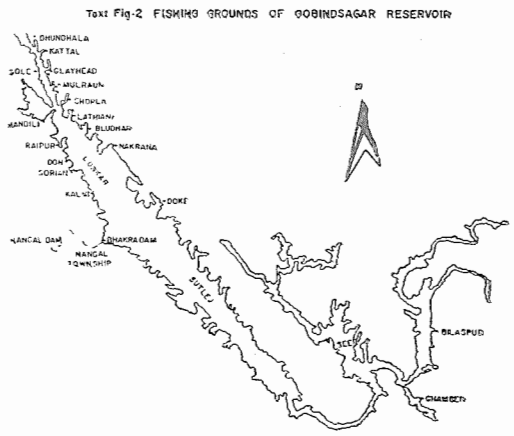
	Monofilament	Multifilament
Webbing material	Monofilament	Multifilament
Type of Knot	Double trawl knot	Double trawl knot
Colour	White (colourless)	White (colourless)
Twine size (Diameter)	0.5mm.	0.5mm.
Mesh size in mm bar	50 ,,	50 ,,
No. of Meshes in length	1000	1000
No. of meshes in depth	30	30
Take up upper and lower edge	50%	50%
Vertical coefficient	0.86	0.86

Rope, lines etc.	Monofilament net		Multifilament net	
	Head rope	Foot rope	Head rope	Foot rope
Material	Kapron	Kapron	Kapron	Kapron
Diameter	3 mm	3 mm	3 mm	3 mm
Length	50 m.	50 m.	50 m.	50 m.

Floats, sinkers etc.	Monofilament net		Multifilament net	
	Floats	Sinkers	Floats	Sinkers
Material	Polythene	Mild Steel	Polythene	Mild Steel
Total Numbers	10	10	10	10
Shape and diameter	Spherical 11.25 cm.	Ring type	Spherical 11.25 cm.	Ring type
Weight in air		100 gm. each		100 gm. each

as a barreir, and the fish could swim through easily without noticing the net.

Though the efficiency of monofilament gill nets for a given species of fish and area of fishing has been thus discussed elsewhere, the suitability of the twine and its efficiency as a fish net material for the Indian waters and grounds have not yet been studied systematically. In this communication the authors have presented the results of comparative fishing experiments conducted with monofilament and multifilament gill nets in the Gobindsagar reservoir. The details of the gear, the catch per unit area for each type of net



in clear and turbid waters, the composition of catch obtained by each net etc. are briefly discussed.

Material and Methods

To study the fishing power of monofilament and multifilament gill nets, comparative fishing method has been used. One unit of simple monofilament and multifilament gill net, each having a mounted length and depth of 50 m. and 2.58m. respectively were surface set at a depth range of 5 to 20m. of Gobindsagar reservoir. The experiments were carried out during the period from May 1966 to July 1967 and a total of 305 operations were made. The nets were laid on all the days at 16.30 hrs., and hauled up on the next day morning at 07.30 hrs. The nets were set both parallel and perpendicular to the shore and the positions were interchanged, so as to give equal chances to both units. The nets were operated in clear and turbid water and along the grounds of different fishing centres of the reservoir. Turbidity of the area of operation ranged from 45 to 287 cm. Text Fig. 1 gives the details of construction and specification of the gear and Text Fig. 2 shows the different fishing centres where the experiments were carried out. Details of area of fishing, number and weight of each species of fish caught from different fishing centres by the two types of nets were recorded daily. Details of catches landed by monofilament and

Table I

Catch efficiency of monofilament and multifilament gill nets in clear water.

Name of Fishing centre	Total area in each type of net operated (sq. m.)	Total catch (kg.)		Catch/1000 sq. m. of webbing kgs.	
		Monofilament gill nets	Multifilament gill nets	Monofilament gill nets	Multifilament gill nets
Kalmi	2600	82.90	51.40	31.89	19.77
Mandli	2340	61.05	44.00	26.09	18.80
Doke	2210	38.40	34.70	17.37	15.70
Kattal	2080	235.30	135.00	113.12	64.90
Glay head	1950	96.10	79.30	49.28	40.66
Doh	1820	140.60	87.00	77.25	47.81
Sorian	2730	84.35	62.90	30.89	23.04
Raipur	1820	77.85	51.60	42.77	28.35
Total	17550	816.55	545.90	46.52	31.10

multifilament nets in turbid and clear water were also noted.

Results & Discussion

The catch per 1000 sq. m. of monofilament and multifilament gill nets for operations in clear water is given in Table I.

As discussed by different authors, mentioned elsewhere, the fishing power of monofilament gill net in clear water was more than that of multifilament gill net and on an average the former was found to be 1.49 times more efficient than the latter. However, the efficiency varied from centre to centre and it was 1.10 times at Doke and 1.70 times at Kattal.

The catch per 1000 sq. m. of monofilament and multifilament gill nets for operations in turbid water is given in Table II.

Though the fishing power of monofilament and multifilament gill nets in turbid water is found more or less the same elsewhere (Parrish *op. cit.* and Wigutoff *op. cit.*), in the present experiments, the monofilament gill nets have been found more efficient in turbid water as well, and on an average, it was 1.57 times more efficient than the multifilament gill nets. The difference in the catch efficiency varied from centre to centre and it was respectively 1.06 times and 2.28 times more efficient at Mulraun and Glad head.

The data were statistically analysed by the variance technique. For analysis only those hauls, where there were equal time of operation for both the nets, were taken and the results are given in Table III.

From the analysis of variance it is seen that the variation between hauls was

Table II

Catch efficiency of monofilament and multifilament gill net in turbid water.

Name of Fishing centre	Total area in each type of net operated sq. m.	Total catch (kg.)		Catch/1000 sq. m. of webbing kg.	
		Monofilament gill nets	Multifilament gill nets	Monofilament gill nets	Multifilament gill nets
Nakraha	2990	174.30	110.95	58.29	37.10
Mulraun	910	40.50	38.10	44.51	41.87
Gole	520	21.70	28.25	41.73	54.33
Dhundhala	1560	93.00	50.60	59.67	32.43
Shorla	8580	1385.80	869.90	162.68	101.27
Bludhar	2990	145.70	93.40	48.73	31.24
Lathiani	2470	270.50	158.60	109.51	64.21
Raipur	1820	98.55	73.20	54.15	40.22
Glay head	130	16.00	7.00	123.08	53.85
Total	21970	2246.05	1430.00	102.23	65.08

TABLE III

Analysis of Variance

Source	SS	DF	MS	F
Total	23029.65	201		
Nets	1856.01	1	1856.01	71.85*
Hauls	18590.55	100	185.9	7.19**
Error	2583.31	100	25.83	

Mean catch of monofilament gill net: 16.66
Mean catch of multifilament gill net: 10.67
**indicates 1% level of significances
* indicates 5% level of significances.

significant at 5% level and variation between the nets was significant at 1% level. The variation between the hauls may be due to the day to day variations in the reservoir level. The significance of variation between nets may be due to the peculiarities of the net materials used for its fabrication.

The nets were randomised during the fishing days and species wise data were collected to know whether a particular species of fish has any preference in respect of any of the two nets. The analysis of data is presented in Table IV.

TABLE IV

Percentage composition of different species of fishes caught by monofilament and multifilament gill nets.

Name of fish	Monofilament gill nets	Multifilament gill nets
Labio diplostoma	77.43	78.62
Labio bata	11.49	9.72
Barbus tor	8.83	9.38
Mystus seenghala	2.13	2.22
Miscellaneous	0.12	0.06

The data clearly indicate that the catch composition remains same in respect of both the nets. The monofilament is as much efficient as multifilament in catching all the four commercially important species of fish of the Gobindsagar reservoir.

ACKNOWLEDGEMENTS

The authors express their thanks to Shri. G. K. Kuriyan, Senior Fishery Scientist, Central Institute of Fisheries Technology, Craft & Gear Division, for offering valuable suggestions during the course of the work. Thanks are also due to Dr. R. V. Nair, Director of the Institute for giving permission to publish this paper. The authors also wish to record their appreciation to Shri. H. Krishna Iyer for the statistical analysis of the data and to Shri. K. A. Sadanandan, Junior Fishery Scientist, C & G for critically going through the muanuscript.

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