COLOURED GILL NETS FOR RESERVOIR FISHING

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Experimental fishing with different coloured nets has shown that white net yields better catch. The efficiency of the coloured nets was in the order yellow, grey, green and blue. Though there is little evidence to show some species preference to a particular colour, the results were not conclusive as the analysis of variance indicated that interaction between species and colour is significant only at 5% level.

INTRODUCTION

Kanda, Koike and Ogura (1958) have observed that with rose coloured nets catches of *Trachurus* were three times greater than those obtained with white nets. Kawamoto (1959) has found that *Anguilla japonicus* displayed no phenomenon of positive phototropism, while other species studied were attracted especially by green or blue light. Kawamoto and Takeda (1951) found that *Oplegnatus*, *Monochantus*, *Sybium*, *Sphiraena* and *Spheroides* showed distinct preference for green and blue light, while *Anguilla* showed no reaction in all cases. Ozaki and Hisao (1951) observed that a single fish of the species *Girella punctata* showed no preference for colour but if several fish were present they always moved towards blue or green colours. Of the five nets experimented in Gobindsagar reservoir yellow coloured nets yielded more catch (George, Khan and Pandey, 1975). Similar experiments in sea have established the superiority of white nets for *Sybium guttatum* and *Sybium lineotatus* and blue and yellow nets for *Sybium commersoni* (Anon, 1968 and 1969).

In view of these conflicting and dissimilar results elsewhere and realising the fact that no two water bodies will be identical in their physical and fishery conditions, experiments were undertaken to evaluate the utility of coloured nets for fishing in Hirakud reservoir.

MATERIALS AND METHODS

Fishing experiments were conducted with frame nets of 1.75 m. frame size (Naidu and George, 1972) with yellow, grey, green and blue webbing, white being taken as control, in Hirakud reservoir during fishing seasons 1972-74. The catch details of each coloured net were collected specieswise. Species selected for analysis

TABLE I

CATCH PARTICULARS WITH DIFFERENT COLOURED NETS

Colour of nets	Area of webbing operated in m.^{2}	Total catch in kg.	Catch/1000m.^{2} of webbing in kg.
White	90420	547.05	6.05
Yellow	91160	333.90	3.66
Grey	91675	299.30	3.26
Green	91160	279.55	3.06
Blue	91160	200.30	2.19

were *Catla catla, Cirrhina mrigala, Labeo fimbriatus* and *Silondia silondia* which form the dominant fishery of the reservoir.

RESULTS AND DISCUSSION

The results of the fishing operations with different nets are shown in Table I.

No coloured net is as effective as white net (control) since white net alone gave nearly double the catch of the most effective coloured net *viz.* yellow.

Specieswise catch of different nets is presented in Table II. The results were subjected to analysis of variance. Results of this analysis giving the significance of variation with respect to each of the factors *viz.* days of operation of nets, colour of the net, species caught and the effect of interaction of above factors are given in Table III.

The results show that between day variation is highly significant. This is as expected because of the long duration over which the experiment was conducted. Also the effect of colour and difference in species turned out to be highly significant. Of these the former appears to have arisen because of the significantly higher catches of white net and the significantly lower catch of blue net than others. The remaining three nets *viz.* yellow, grey and green are more or less equal in their performance. Of the variation due to species, *Silondia silondia* has been found to be more significant than other species and *L. fimbriatus* less significant.

The interaction of days and species is highly significant indicating that certain species were caught in certain days in more quantity than others. The days and colour interaction is not significant. This means that the catch efficiency of any particular coloured gill net has not changed with the days of operation of the net. The interaction of species and colours is just significant (significant at 5 % level only) which only suggests, but does not conclusively establish, that certain species have preference for particular coloured net.

The interaction between the colour of nets and species has come out significant because (i) higher catch of *L. fimbriatus* in yellow net than others, (ii) barring white net higher catch of *Catla catla* in yellow net and of *C. mrigala* in grey net, and (iii) unlike other nets, as much as 80% of the catch of green net consists of *S. silondia* only.

The hypothesis behind colouration of nets is that the colour will serve as camouflage, as an attractant, or as a deterrant to cause variation in catch rates of different species in gill nets (Jester *et al.*, 1970). Applying this hypothesis to the results of the present investigation (Table I and III), the colouration of the nets might have acted only as a deterrant which corroborates the findings of Jester (1973) that the most significant difference consisted in reduced catches in coloured nets.

Though visibility is one of the decisive factors in the efficiency of gill nets, this cannot be taken to prove that completely invisible nets induce the maximum catch. It has been reported that the gill net catch of perch (*Perca fluviatilis*) and roach (*Rutilus rutilus*) does not increase in direct proportion to decreasing visibility of the webbing (Steinberg, 1964). Thus if colouring is taken as one of the methods of decreasing visibility, it is not always successful as evidenced in the present investigation. Similar observation was made by Molin as quoted by Nambiar, (1973) who found that the similarity between the colour of the bottom and that of the net is more significant in increasing the catch rather than matching the colour of the net with that of water.

The observation of George *et al.* (*Op. cit*; 1975) that yellow coloured net gave increased catches may be attributed to the difference in fishery of Gobindsagar when compared to that of Hirakud reservoir. The main fishery of Hirakud reservoir consists of four species *viz. S.*

TABLE II

SPECIESWISE CATCH WITH DIFFERENT COLOURED NETS

Colour of net	Species caught in kg.				Total
	S. silondia	*L. fimbriatus*	*C. mrigala*	*C. catla*	
White	233.80	14.20	52.65	90.80	391.45
Blue	112.75	7.30	4.80	25.30	150.15
Grey	139.40	15.35	25.30	35.20	215.25
Green	157.20	9.20	19.00	11.30	201.70
Yellow	136.15	23.70	10.00	67.65	237.50

TABLE III
ANALYSIS OF VARIANCE

	D. F.	S. S.	M. S.	F	
Days	169	885.1906	5.2378	3.36	**
Colours	4	48.6657	12.1664	7.81	**
Species	3	379.2591	126.4197	81.11	**
Days X colours	676	967.5760	1.4313	<1	N. S.
Days X species	507	2541.8170	5.0134	3.22	**
Species X colour	12	34.0061	2.5338	1.82	*
Days X species X colour	2028	3160.9022	1.5586		
Total	3399	8017.4167			

N.S. = Not significant

*Significant at 5% level
**Significant at 10% level

silondia, *C. catla*, *C. mrigala* and *L. fimbriatus*. Even these are sparsely distributed whereas the fishery in Gobindsagar is dominated by *Labeo diplostoma* and *Labeo bata* forming about 78% of the total catch (George *et al.*, 1975) and are known to be concentrated.

It is well known that the catchability of a coloured net varies from species to species and within species between a single fish and a group of fishes (Osaki and Hisao *op. cit.*, 1951). Thus the ineffectiveness of coloured nets in Hirakud reservoir may be attributed to the sparsely distributed fish population and their irregular availability as evidenced from analysis of variance (Table III), wherein the interaction between days and species was found to be highly significant.

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* Not consulted in original.