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Experimental Trawling in Hirakud Reservoir

V. C. GEORGE, PERCY DAWSON, A. A. KHAN and M. D. VARGHESE
Burla Research Centre of Central Institute of Fisheries Technology, Burla-768 017

Results of trawl fishing experiments conducted in Hirakud reservoir are discussed. Trawling has been found to be efficient than conventional gear in removing predators and trash fishes especially of the bottom. This method can be of much help in controlling the proliferation of such fishes in many Indian reservoirs.

India has vast inland water resources spread throughout the country. The water spread area of these reservoirs covers about 3 million hectares. The bottom of many reservoirs possessed submerged forests, ruins, rocks, stones and other obstacles (Gulbadamov, 1962; Znamensky, 1967 & Natarajan, 1976). The presence of these underwater obstructions limits the use of active gear in most of the Indian reservoirs (Sulochanan *et al.,* 1968; Kuriyan, 1973). Due to such obstructions passive gears such as set gill nets are apparently the only types possible (Kuriyan, 1973).

In reservoirs that are constructed recently, adequate measures like de-forestation and clearing of the boulders and other obstacles are being taken for fishery purpose. This will greatly help the introduction of active gear like trawls and shore seines for the exploitation of fishery resources.

Even though trawl fishing is well established in marine waters, it is yet to make a beginning in Indian reservoirs and lakes. According to Meschkat (1956) trawl fishing is done at Lake Dojran in Yugoslavia to catch big carps, cat fishes and perches. Ellis & Pickering (1973) reported that carps dominated all trawl drags in Saginaw Bay area of Lake Huron. Bottom trawl experiments conducted at lake Rudolf, Kenya, showed that non cichild fish formed a high proportion of catch in all areas and tilapia were caught in appreciable numbers only in sheltered waters (Hopson, 1975). Tests carried out in Lake Constance, West Germany, led to wider use of small pelagic trawls in lake fisheries (Anon, 1979). In Federal Republic of Germany, two boat bottom trawling was done as most of the boats had only small engines (Steinberg 1964).

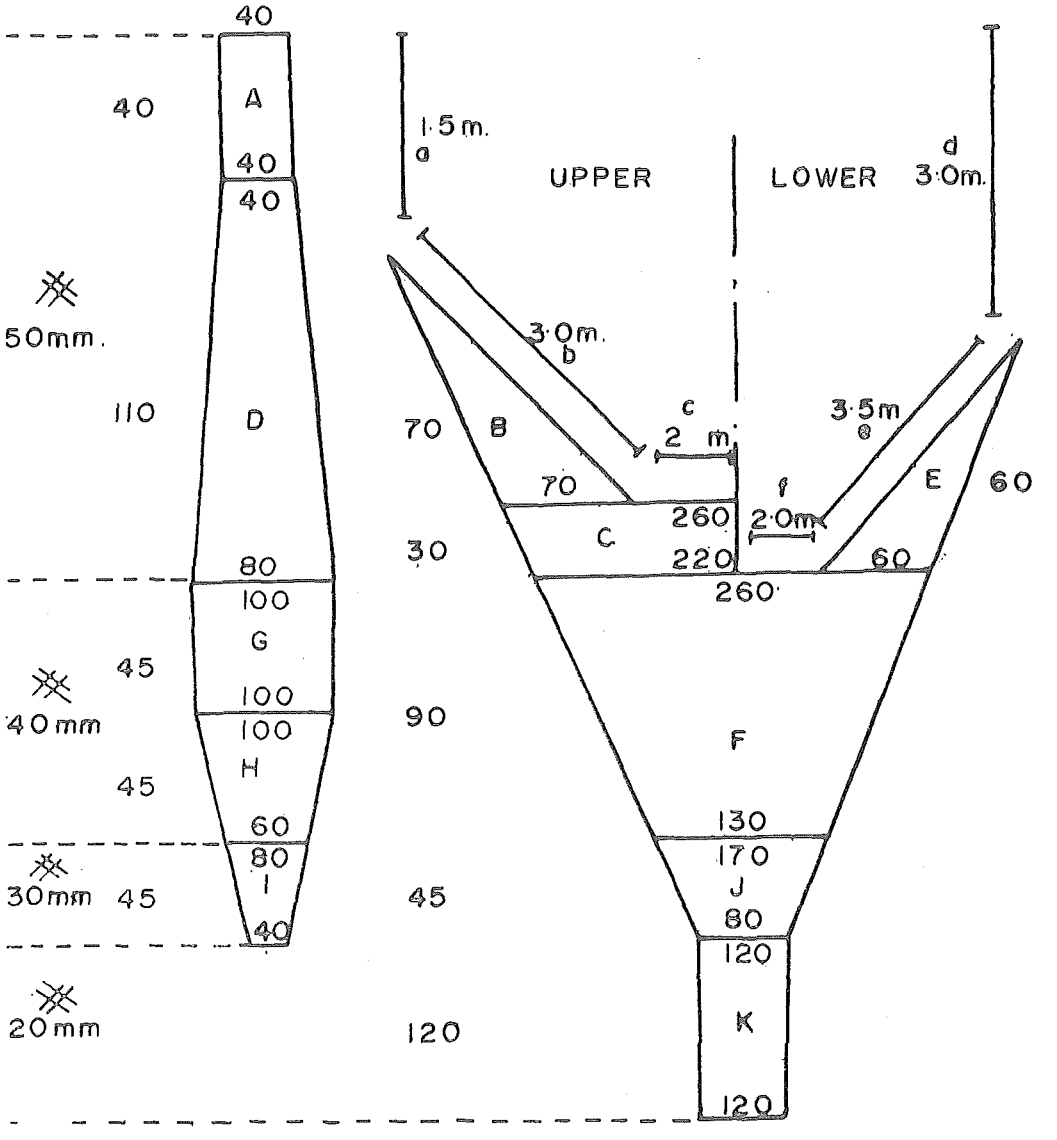
Recent studies on the species-wise landings from Hirakud reservoir (Varghese *et al.,* 1981) revealed that the cat fish and trash fish together constituted 68.36% of the total catch and the rest were carps. The fishery of this reservoir is mainly exploited with gill nets and lines. But in view of the sparse nature of fish population, Znamensky (1967) suggested the use of active gear like trawls. This paper reports the attempt on experimental trawling in Hirakud reservoir by the authors.

Topography of Hirakud reservoir

The Hirakud reservoir formed across Mahanadi river in Orissa has possibly the largest water spread of 74,592 hectares with a shore line of 643.6 km at the maximum water level of 192.15 m from mean sea level. The reservoir is generally shallow with middle and lower reaches deeper than other regions. Though the reservoir bed is littered with stones, boulders and tree stumps, there are areas of soft bottom caused by silting, particularly the river beds. Hence, fishing could be done mainly in the silted area of the river course, and in the upper and middle reaches of the reservoir.

Materials and Methods

Experiments were conducted in the upper and middle reaches from January 1979 to March 1979 and from September 1979 to October 1979. Trawling could not be



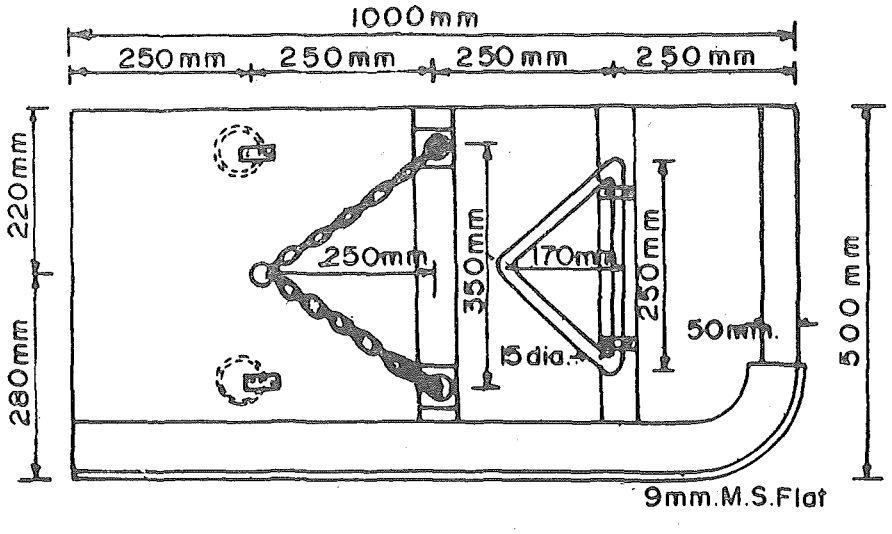


Fig. 1. 13m bulged belly and otter trawl

undertaken during pre-monsoon and monsoon months due to heavy winds and flood waters causing strong currents. A 13 m bulged belly trawl (Fig. 1) was operated from 9.1 m boat powered by 40.7 HP engine. Mainly bottom trawling was attempted.

Trawling was done at a towing speed of 1.942 knots at depths 6–12 m. Each haul was generally of 20 min duration. The catch per effort was calculated in kg/h of trawling. The depth-warp ratio was fixed as 1:3. A total of 155 hauls were made. The risk of running over gill nets and lines limited the duration as well as area of operation.

Results and Discussion

The species wise composition by weight and their percentage is given in Table 1. It could be seen that cat fishes formed 38.2% by weight of the total catch and the rest were trash fishes. The catch/h was worked out as 19.4 kg.

The virtual absence of major carps in the catch revealed that this gear may not be a destructive gear to the fishery. Hence, in reservoirs where there is predominance of cat fishes and trash fishes, this method may be adopted to check further proliferation of these fishes.

Table 1. *Species composition of fishes*

Species	Weight kg	Percentage
Mystus seenghala (Sykes)	155.71	14.60
Mystus aor (Hamilton)	117.50	11.01
Wallago attu (Schneider)	48.40	4.54
Rita chrysea (Day)	62.68	5.87
Rohtee cotio (Day)	522.08	48.92
Notopterus chitala (Day)	28.0	2.62
Silonia silondia, Ailia coila (Hamilton) and others	132.80	12.44
Total	1067.17	100.00

Table 2. *Details of* 13 *m bulged belly trawl*

	A	B	C	D	E	F	G	H	I	J	K
Stretched mesh (mm)	50	50	50	50	50	40	40	40	30	30	20
Upper edge mesh	40	1	260	40	1	260	100	100	80	170	120
Lower edge mesh	40	70	220	80	60	130	100	60	40	80	120
Depth mesh	40	70/140	30	110	60/120	90	45	45	45	45	120
No. of pieces	2	2	1	2	2	2	2	2	2	2	2
Cutting rate	Allp	lp2b	lp4b	2plb	lp2b	lp5b	Allp	3p8b	5p8b	5p8b	Allp
Hanging coefficient	75%	55%	50%	75%	55%	50%					
Rope length m	a=1.5 b=3.0 c=2.0 d=3.0 e=3.5 f=2.0										
Material	A–J 1mm. dia Garfil blue colour										
Weight of net	28 kg										

It is to be pointed out that there is no efficient method to exploit the deep water fishery resources of reservoirs. Gorman (1965) suggested to operate trawl nets to exploit bottom dwellers like bream, where conventional gear is not effective in exploiting the deep water fishery. The occurrence of bottom/off bottom fishes like sciaenids, *N. notopterus, R. chrysea, Mystus* sp. and *R. cotio* indicate that bottom trawling is effective for the removal of those fishes.

The results obtained through bottom trawling in Hirakud reservoir provide scope for introducing this technique in other reservoirs. Experimental trawling could be successfully carried out in the silted area of the reservoir bed and in the river course.

The significance of trawling should also be viewed not only from the commercial point of view but also from the management aspect. According to Natarajan (1975) most of the cat fishes are predatory in nature and their proliferation affect the recruitment potential of major carps and suppress their development to below optimum level which suggests the eradication of predators and trash fishes. National commission on Agriculture (Anon, 1976) has also expressed similar views. Further the existing methods like gill netting and lines perclude the capture of small trash fishes and bottom dwellers.

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