Trawling in Indian Reservoirs

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The fishing gear normally employed for harvesting the vast fishery resources of the Indian reservoirs are traditional gill nets, entangling nets, lines and shore seines. Burla Research Centre of CIFT (Burla, Orissa) successfully conducted experimental trawl fishing in Hirakud reservoir. The results were quite encouraging. The catch consisted mainly of catfishes and unwanted trash fishes. Carps were conspicuously absent in the catch. Trawling has been found to be more efficient than conventional gear in removing predators and trash fishes especially off the bottom. This method can be of much help in controlling the proliferation of such fishes in many Indian reservoirs.

Key words : Trawling, reservoirs, predators, trash fishes, fisheries management, Hirakud reservoir, Gandhisagar reservoir.

India is one of the leading nations in the world in the abundance of inland water resources. Over the years India has built a large number of dams and barrages to harness the water potential for irrigation, power generation, navigation and fisheries. Of these, reservoir constitute the prime inland fisheries resources. Total water spread of the 19370 Indian reservoirs covers about 3.15 million ha. Of these, 180 reservoirs are of medium size (1000-5000 ha) and 56 of large size (>5000 ha), covering a water spread area of about 53,000 ha and 11,40,000 ha, respectively (Sugunan, 1997). The freshwater reservoirs in the country are a growing class of impounded water resources for fish production. A major increase in inland fish yield is from reservoirs because of construction of a number of new dams and improvements in reservoir fisheries.

The bottom of many reservoirs is obstructed by 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 like set gill nets are apparently the only types possible. (Znamensky, 1967; Kuriyan, 1973). Mitra & Durve (1969) recommended operation of bulk catching gear in reservoirs having favourable grounds and conditions. Though trawling is an established fishing technique in the marine sector, it is yet to make a beginning in reservoirs, due to the prevailing peculiar topographical conditions and underwater obstructions. Meschat (1956), Steinberg (1964) Ellis &
Pickering (1973) and Hopson (1975) reported the application of this technique in reservoirs and lakes of many foreign countries. In reservoirs that are constructed recently adequate measures like deforestation and clearing of the boulders and other obstacles are being taken up for fishery purposes. This will greatly help in the introduction of active gear like trawls and shore seines for the exploitation of fishery resources.

The fishery of Indian reservoirs are exploited mainly by gill nets, seines and lines. According to Znamensky (1967) lack of shoals moving about in the reservoir suggests the use of active types of fishing gear. Studies on the species-wise landings from Hirakud reservoir (Varghese et al., 1981) revealed that the catfish and trash fish together constituted 68.36% of the total catch and the rest were carps. In Gandhisagar reservoir 63.05% of the catch was constituted by catfish and trash fish (Kartha & Rao, 1987). It would be desirable to reduce the population of undesirable fishes such as predators and trash fishes, as much as possible, in order to improve productivity of major carps (Anon, 1976). Trawling is an efficient fishing method available for this purpose. Znamensky (1967) also suggested the use of active gear like trawls whenever the fish population is sparsely distributed.

Fishery resources

The reservoir fishery is constituted by major carps like *Catla catla*, *Cirrhinus mrigala*, *Labeo rohita* and *L. calbasu*; cat fishes like *Aorichthys aor*, *A. seenghala*, *Silonia silondia*, *Wallago attu*, *Eutropiichthys vacha*, *Rita chrysea*, *Ompok bimaculatus*, *Pangasius pangasius* and trash fishes like *Rohtee cotio*, *Gudusia chapra*, *Alea coilea*, Puntius spp., *Chela* spp., sciaenids and several other species. Except for major carps, many of the fish fauna are either predators or uneconomical fishes. (Khan, et al., 1983; Jingran, 1983; Kartha & Rao, 1993; Sugunan, 1997)

Fishing ground

Trawl fishing can be done mainly in river courses and in the silted area of both upper and middle reaches of the reservoir. In Hirakud reservoir trawling could not be undertaken effectively, during April-June, due to low water level and during July-August, due to flood waters and strong currents. According to Kartha & Rao (1993) two-boat midwater trawling could be conducted in Gandhisagar reservoir during May.

Experiments at Hirakud and Gandhisagar reservoirs

Major catch in both Hirakud and Gandhisagar is catfishes and trash fishes (Khan et al., 1983; Kartha & Rao, 1993). George et al. (1982; 1986) and Kartha & Rao (1987) carried out single boat bottom trawling in Hirakud and Gandhisagar reservoirs for weeding out both predatory and trash fishes. A 12 m high opening trawl rigged with 1000x500 mm flat rectangular wooden otterboards were used in Hirakud reservoir while at Gandhisagar a 12.5 m dual-purpose trawl was used. The high opening trawl
operated at Hirakud landed a total of 2705 kg of fish with an average catch rate of 48.35 kg.h⁻¹, whereas the dual-purpose trawl operated in Gandhisagar, obtained an average catch rate of 35.7 kg.h⁻¹. Experimental two boat bottom and midwater trawling has also been attempted in Gandhisagar reservoir (Kartha & Rao, 1993).

Discussion

Trawling can be introduced in the medium and large reservoirs for successful eradication of undesirable species such as predatory and low value fishes and thus indirectly increase production from reservoir fisheries. In many Indian reservoirs where there is no natural breeding stock, major carps are stocked every year. It is to be mentioned that major carps are caught in two-boat mid water and bottom trawling at increased trawling speeds in Gandhisagar reservoir (Kartha & Rao, 1993). If the targeted species are carps, this is one method for bulk catching of the desired species. Reservoir being an enclosed water body with lots of underwater obstructions, active fishing area is generally restricted. Trawling can be done only in the river courses and in the silted areas, devoid of rocks, submerged tree stumps and other underwater obstructions. In India majority of the reservoirs being medium and small, it may be difficult to operate two-boat trawling. Instead, single boat trawling may be attempted for the eradication of predators and trash fishes as they compete with carps for food. The virtual absence of major carps in single boat trawling operations in the catch revealed that this gear may not be a destructive one to the economically important fishery. It is to be mentioned that there are no bulk catching methods available, to exploit the deep water fishery resources of reservoir. The occurrence of bottom and off-bottom fishes like sciaenids, Notopterus notopterus, Rita chrysea, Aorichthis spp., Rohtee cotio, Ailea coilea, Wallago attu, etc., indicate that bottom trawling is effective for the removal of these fishes.

The advantage of trawling as a fishing method for reservoirs should be viewed in the context of its effectiveness for eradication of unwanted predatory fishes and thus supporting management and conservation of stocked commercially important species. Most of the catfishes are predatory in nature and their proliferation affect the recruitment potential of major carps and suppress their development to below optimum level (Natarajan, 1985). National Commission on Agriculture has also expressed similar views (Anon, 1976). Two-boat trawling can be attempted in large reservoirs, if desired, for the capture of economically important size groups of fishes through aimed trawling. According to Steinberg (1971), two-boat trawling would be of great interest as an efficient method and more economical in freshwater and coastal fisheries of developing countries.
Trawl fishing has been successfully conducted in Hirakud and Gandhisagar reservoirs. The results obtained in bottom trawling provide scope for introducing this fishing technique in other reservoirs where trawlable grounds are available. Removal of underwater tree stumps, bushes and other obstructions in the fishing ground is essential, for safe and effective trawling. It is mainly recommended based on management and conservation point of view for the bulk removal of predators and trash fishes, which normally feed on juveniles and sub-adults of target species.

The author is grateful to Dr. K. Devadasan, Director, Central Institute of Fisheries Technology, Cochin for permission to publish this paper.

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