ERADICATION OF PREDATORY FISHES IN FISH PONDS AND NURSERY PONDS USING ELECTRICITY

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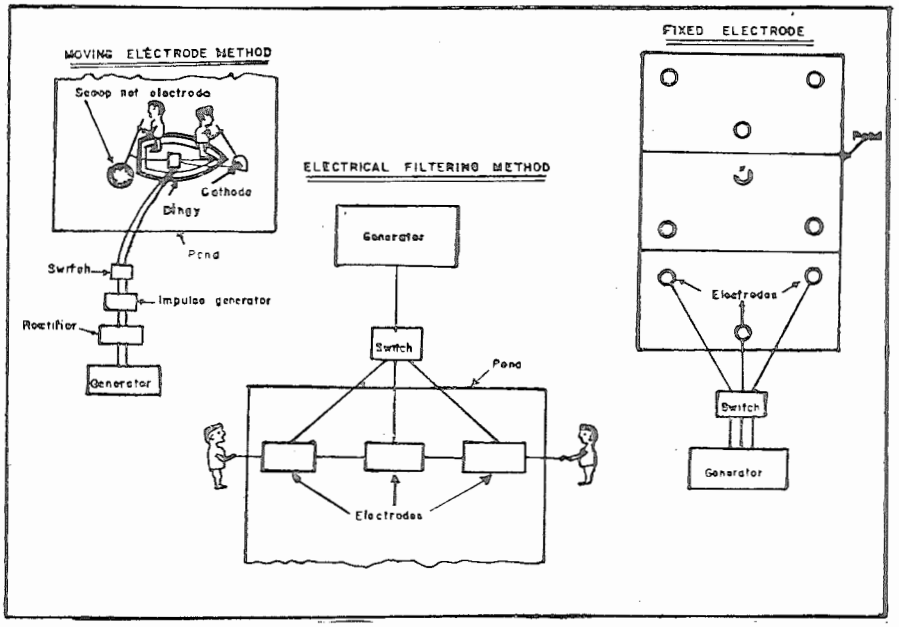
INTRODUCTION

Prior to stocking economic species in tanks and nursery ponds, all the unwanted and predatory fishes in them will have to be removed. Even though most of them can be caught with ordinary gear such as cast net, drag net, scoop net etc. total or absolute eradication is not possible and those left over are sufficient to destroy all the fingerlings introduced. Chemicals and other poisonous substances which can kill the predatory fishes cannot provide a solution to the problem as introduction of such chemicals will pollute the water and the harmful effect of these chemicals will linger for long periods thus making the waters unsuitable for pisciculture. The alternative method is to drain the pond completely which will not only be uneconomical, but will not be very effective either, as predators such as murrels and cat fishes can dig into the muddy bottom and be alive as long as the mud is not completely dried up. Development of an electrical method for killing all the predatory fishes at reasonable cost is; therefore, expected to provide a solution. This paper deals with a few methods, based on the use of electricity and which are suitable for different ponds.

MATERIALS & METHODS

A 3 phase diesel generator set of 6.5 KW, 400V, 50 cycles, a rectifier, an impulse generator and the connected switch gear were the main equipments used in the experiments. The work was carried out in a pond of size 30m. X 15m. having maximum depth of 3 metres. There were facilities to drain the water in the pond and to fill in as and when required. Initially, in the pond there were many fresh water fishes such as murrels, cat fish, anabas, tilapia etc. Over and above this, a stock of fish was kept in a small pond nearby for introducing into the pond whenever required. Electrodes were of different designs and materials such as mild steel sheet, welded steel mesh etc. TRS electrical cables of 2 core 31/0076 construction were made use of for connecting the electrodes to the source of supply. A small dingy with two persons on board was used for operating the gear. Vertically hung webbings of 25 mm. mesh size were made use of for dividing the pond into smaller sections.

Three different methods were tried successfully and the procedure to be adapted for each set of experiments was decided by trial and error method.



(a) *Moving electrode*

Fig. illustrates the operations carried out from a dingy. This method is suitable where the fish in the pond is to be collected and used for human consumption.

Two persons were on board the dingy - one for rowing the dingy and the other for carrying out the different operations. Two electrodes - one of mild steel sheet and the other in the form of a scoop net having a mild steel frame and cotton webbing, were used. The cathode of the impulse generator was connected to the sheet metal electrode fixed on the side of the dingy and the anode was connected to the scoop net electrode which was carried by the operator. The connections were given through TRS flexible cable with two switches, one on the bank of the pond and another in dingy. The switches were kept on and dingy was rowed from one point to another in the water. The scoop net electrode was kept under water all the time. If any fish in the field was stunned, they were easily collected with the help of the scoop net. By contuning this operation, most of the bigger fishes in the pond could be removed. The effect of the electrical field extends to about one metre into the mud.

(b) *Electrical filtering*

This method is most suitable where the depth of the pond does not exceed 2 metres. The details of the operation are illustrated in the Fig.

In this method, three electrodes were hung on a rope in a row equidistant from one another in water and the rope was held across the pond. Connections to the electrodes were given from the generator. One phase being connected to each electrode through T.R.S. cable. The rope was held by two persons one on each bank of the pond in such a way that the electrodes were fully immersed in water. When the switch was put 'on' the rope was dragged from one end of the pond to the other slowly. When the electrodes reached the other end it was seen that a head of fish got stunned there. This was because all the fishes which swam away from the electrical field to farthest end, found no way of escaping. They remained in the field and got stunned. The electrodes were held in that position for half an hour. After that

TABLE

Method	Type of electrode	Voltage applied	Power required	Fish	Qty.	Size groups Max. length in mm.	Size groups Max. girth in mm.
Moving electrode	Y-shaped electrode	150 V 50 impulse/sec.	2 K. W.	Murrels	11 nos.	380	135
				Megalops	9 nos.	270	185
				Cat fish	7 nos.	380	121
Electrical filterning	Expanded metal	400V AC. 50 cycles/sec.	2 K. W.	Murrels	18 nos.	300	110
				Barbus	25 nos.	75	25
				Climbing perch	5 nos.	125	55
				Cat fish	2 nos.	325	110
Fixed Electrode	Expanded metal	400V AC 50 cycles/sec.	6 K. W.	All the fish in the pond were killed and this was verified after draining the pond.			

the rope was dragged back slowly to the starting end. On reaching that end the electrodes were held stationary for half an hour. Thus all the fishes were herded to the ends and were electrocuted there. The operations were repeated four times to make sure that no fish was left alive. The water was drained and checked for any living fish and none was found after repeated operations.

(c) *Fixed Electrode Method*

Three electrodes were fixed in water in such a manner that each electrode represented the vertex of an equilateral triangle of 3 metre side. From earlier studies (Namboodiri 1966), it has been found that for a potential difference of 400 volts between pairs of electrodes each electrode can cover a spheroical volume of water of 3 metre diameter. Each electrode was connected to one phase of the generator through TRS Cable and a switch. Supply was given and maintained for five to six hours continuosly. By this time all the fish in that area were electrocuted.

RESULTS AND DISCUSSION

With the moving electrode method, it was not possible to completely eradicate the fish in the pond. However, it was possible to catch bigger fishes (Table). But with the other two methods, it was not possible to collect the stunned fish because they were not within reach from the bank. To get the best result out of the moving electrode method impulse current had to be made use of.

Electrical filtering method and fixed electrode method are quite effective in clearing the predatory fishes from ponds because the stunned fishes remain in the electrical field for long enough to be killed. Whereas in the moving electrode

method since the dingy with the electrodes was moving electrical field also moved so that the fish after getting stunned remained in water where there was no electrical field.

After some time they became normal and thus escaped. Whatever was seen in the stunned stage in the process could be collected. In clear water almost all the stunned fish will be seen since they will be lying with the whitish belly portion up. But in muddy water only bigger fishes will be seen. If the area of the pond is more than could be electrified by one set of fixed electrode the pond could be divided into sectors by hanging webbings vertically and each sector can be electrifield one by one.

The cost of operation of eradication of predatory fishes in a pond depends mainly on the area of water surface in the pond. However, for a small pond of about 500 sq. metres with an average maximum depth of 3 metres the cost works out to about Rs. 3/- per 10 sq. metres.

ACKNOWLEDGEMENT

The authors are grateful to Shri G. K. Kuriyan, Senior Fishery Scientist cum Head of Division (Craft & Gear), Central Institute of Fisheries Technology for the encouragement and help given during the course of the work. The authors are grateful to Shri M. Velu, Fishery Scientist, Central Institute of Fisheries Technology, for going through the manuscript and making necessary corrections.

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