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PROPAGATION OF MAHSEERS IN HIMALAYAN WATER OF NEPAL

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Transplantation of the Mahseer in New Habitats

July 1 to December, 30, 1987

INNOVATIVE SCIENTIFIC PROGRAM (ISRP)
PROJECT NO (3E - 30)

Interim Report

By

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In Collaboration With:

Tribhuvan University
Kathmandu, Nepal and
University of Arkansas and
US Fish and Wildlife Service

Endorsement by

Department of Wildlife Conservation
Principal Private Secretariat
Royal Palace Kathmandu (NEPAL)

Funded by US Agency for International Development,
Washington, D.C.

Rec'd in SCI:

007 7/13/89

PROPAGATION OF WILD MAHSEER - A SUPERIOR COLD WATER
GAME FISH OF THE HIMALAYAN WATERS OF NEPAL

1. Use of Anesthetics for the Handling and Transport of mahseer in new habitats.

Golden Mahseer (*Tor putitora*) has intriguing prospect for the development of recreational fisheries in the fall waters of dams and reservoirs. There is a wide scope of propagation of mahseer in ponds, lakes and reservoirs where optimal habitat conditions exist. For this purpose constant supply of fries, fingerlings and brood fish are to be made from spawning beds of rivers or from riverside hatchery. For the present pilot study, river-caught the fingerlings and adults used to be transported in oxygen filled bags from the Trisuli river to the water bodies of Kathmandu. The replanting result is encouraging and worth for practicing in national wide mass scale.

Mahseer fingerlings and adults frequently experience heavy mortality during hauling, which is to some extent counteracted when salt is added to the transport water and in some species, by adding anesthetic to transport water. The present study was conducted to determine methods, concentration, and kinds of anesthetics appropriate for use in hauling water for the successful or truck transport of Mahseer for as long as 10 hours. Mahseer were collected by Gill net from the Trisuli river and anesthetized immediately. Mean total lengths and weights of adult 20 males were 50-60 cm and weight 8 to 10 kg and fingerlings 18 to 20 cm and weight 45 to 50 grams.

The anesthetics I evaluated was Tricaine Methanesulfonate (MS 222), and an experimental drug. The anesthetized fish were used immediately in a series of testes to evaluate these anesthetics at various concentrations and a stocking density of 2 fish / 10 L of water. In pilot tests of higher stocking densities of 4 to 6 fish / 10 L of water, all fish died. Fish were also held without anesthetic (control) in transport water containing either salt (0.5%) or common salt (10%). The tests were made in double lined plastic bags held in boxes. Air was forced out by deflating the bags to water level. Oxygen was then added and the bags were sealed and covered. Boxes were then left unattended for 10 H. Bags were opened and fish behavior evaluated by the criteria described by McFarland (1960), with modifications. Fish were acclimatized to 11-13°C and then released together in troughs for observation 10 H later to evaluate their behavior after anesthesia.

Hauling Mahseer by Truck

Three additional tests were conducted to determine the best method for hauling mahseer by truck. Anesthetized fish were put into a rectangular tank containing 5000 L of water with anesthetic and salt. A false top (Chittenden 1971) about 5 cm below the water line acted

as a baffle and oxygen (3 - 5 L / min) was added through a porous pipe. Fish were hauled in the tank for 10 h. then removed to a holding trough for a 10 H observation period.

Concentrations of MS - 222 were tested at 5 - mg/L increments up to 35 mg/L. Fish did not survive at the 1 mg/L concentration, but did at the higher concentration up to 15 mg/L exhibited loss of equilibrium; those exposed to 20 - 25 mg/L were lightly anesthetized and those exposed to 30 - 35 mg/L exhibited deep anesthesia. All fish quickly revived during tempering. Water quality was better at higher levels of MS - 222. The deep anesthesia at 30 - 35 Mg/L indicated that lethal concentrations were approached.

Hauling Mahseer by Jeep

For making a field evaluation MS - 222 (25 mg/L) transport to Kathmandu, by Jeep is made. Two fish were put into each bag containing water (25°C; 10% salinity), anesthetic, 0.5 mg/L. Bags were inflated with O₂ and ice was added to the Styrofoam boxes. Seventeen boxes of fish with MS - 222 were driven to Kathmandu. Fish were acclimitized by floating the bags in a pond at heart of the Balaju fish pond, after the trip. Water temperature in the bags was about 18°C, whereas in the pond it was 16°C. All fish survived and appeared in good condition when released in the pond. After 1 month two mortalities were noted.

The effectiveness of MS - 222 in different species of fish are variable in the United States experiments on the threadfin shad (*Dorosoma petenense*) and gizzard shad (*D. copedianum*) were hauled successfully in 22 mg/L of MS - 222 (Collins and Hulse 1964; Anderson 1968), whereas the American shad (*Alosa sapidissima*) were itolerant of a 10 - mg/ L dose of MS - 222 (Murai et al. 1979).

Further studies may show that stocking densities in both bags and tanks could be increased. Results of my present tests, however, confirm that every effort should be made to reduce stress and scale loss during the handling and transport of mahseer.

Adult mahseers were put in the big earthen pots filled with water. Natural red clay collected from river bank is rich in haematite 200 gram in 40 liter of water were put. Common salt concentration most maintained to 0.5%. Three changes of water were made during the transit, each change made after a one-hour interval and fresh red soil and salt is added at each interval. The atmospheric oxygen dissolved in water were found sufficinet for the hand carried fish. Splashing effect of water provided good aeration while carrying the fish in earthen pots. This method is useful at places where manpower is cheap and access by road is poor.

The successful mahseer transplantation were carried out with the financial assistance of USAID Mahseer Ecology Project granted to Dr. Tej Kumar Shrestha. The present work demonstrates the possibility

of augmenting depleted stocks of mahseer in the tail waters of dams and reservoirs of Nepal to rebuild the population declining owing to this carrier effects of dams, oversilting and habitat loss. Only their fingerling of mahseer is recommended for transplanting and restocking. by using anesthetics and therpautic oxygen inflated,bags. It has been possible to release mahseer over a long distance (more than 180 kms) from the Trisuli to the Kulaekhani reservoir. Mahseer fingerlings has been stocked in fish ponds of Balaju Recreational Garden. Royal Fish Ponds at Cokarna for experimental studies.

Classification of the Behavioural Changes. Occuring
Mahseer Under Anesthesia

Anesthesia		
Stage	Classification	Fish Behaviour
0	Normal or natural	Highly excited, frantic reaction to external stimuli when caught from riverine habitat.
1	Drugged	Decreased reaction to external stimuli, but swimming ability retained.
2	Loss of Equilibrium	Able to stay afloat, but unable to maintain body equilibrium.
3	Light anesthesia	Total loss of swimming power, but able to move on the bttom (with tail movement)
4	Deep anesthesia	No movement on bottom, gill movement greatly reduced.
5	Death	Gill movement ceased, fish float belly upwards.

ACKNOWLEDGEMENTS

I am thankful to Mr. B. B. Shah, Deputy Secretary, Department of Wildlife Conservation, Principal Private Secretariat Royal Palace Kathmandu, for kind permission to release mahseer fry in Royal ponds in Raj Nikunja Cokarna. I am also thankful to Mr. Dharma Bahadur Thapa, Zonal Commissioner, Bagmati Zone for his permission for the release of Mahseer fry and fingerlings in the Balaju recreational ponds. Thanks are due to Mr. Rohit Bahadur Thapa, Additional Secretary, Department of Agriculture, HMG for his keen interest in Mahseer propagation program.

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