

BIO- ETHOLOGY OF BREEDING OF THE GANGETIC MAHSEER *TOR PUTITORA* (PISCES: CYPRINIDAE) FROM GARHWAL, CENTRAL HIMALAYA, INDIA

ANOOP K. DOBRIYAL, PRAMILA BAHUGUNA and HEMANT JOSHI

Department of Zoology,
H.N.B.Garhwal University Campus,
Pauri Garhwal- 246001, Uttarakhand, India

ABSTRACT

Present study is an attempt to analyse the maturity conditions and spawning ethos of a potamodromous migratory fish *Tor putitora* (Hamilton). The study was conducted in the lower reaches of the river Ganga (Feeding and rearing ground) and its two nearby spring-fed tributaries (Song and Suswa streams) which is its one of the closest breeding ground). On the basis of macroscopic and microscopic study, the fish was categorized into five maturity stages as immature, maturing, mature, spawning and spent. Observations on the ova diameter frequency polygons of the ovaries in mature and spawning stage, fluctuation in the gonado-somatic index, and occurrence of fish of various maturity stages during different months along with the presence of juveniles, it was concluded that the fish is a prolong breeder which spawns intermittently during September - October. On the hypothesis of 50 % level in maturity it was concluded that the male and female fish matures almost simultaneously at a size of about 57-59 cm. Viewing the locations of occurrence of fry and fingerlings, it was assessed that the fish prefers spawning in a substratum which has a bed of pebbles, cobbles and gravels. The temperature and pH of the breeding site was recorded in a range of 23-26°C and 7.4-7.5 respectively. It was observed that a consortium of the factors like flooded and turbid water along with maturation pressure, and lowering down of pH stimulated migration in the fish which lasted at the act of spawning when they reach at a proper place.

Key Words: Golden mahseer, Maturation, Spawning frequency, Spawning season

REFERENCES

1. Johal, M.S., Tandon, K.K. and Sandhu, G.S. Maturity, fecundity and sex ratio of an endangered coldwater fish, Golden mahseer, *Tor putitora* (Ham.) from Govindsagar (H.P.), India. In Singh, H. R. and Lakra, W.S. Ed. : Coldwater Aquaculture and fisheries. 2000, Pp. 265- 278.
2. Khan, H. Study of the sex organs of mahseer (*Barbus tor*). *J. Bombay nat. Hist Soc.* 1939, **40**: 653-656.
3. Nautiyal., P. Natural history of the Garhwal Himalyan mahseer *Tor putitora* (Ham.) II. Breeding biology. *Proc. Indian Acad. Sci. (Anim. Sci.)* 1984, **93**: 97-106.

4. Pathni, S.S. Reproductive biology of the golden mahseer *Tor putitora* (Ham.) from kumaun Himalayas. In: Singh, H.R. and Lakra, W.S. (Ed.): Coldwater Aquaculture and Fisheries, NPH, New Delhi. 2000, Pp. 253-264.
5. Qasim, S.Z. and Qayyum, A. Spawning frequency and breeding season of some freshwater fishes with special reference to those occurring in the plains of Northern India. *Indian J. Fish.* 1961, **8(1)**: 27-43.
6. Sehgal, K.L., Shah, K.L. and Shukla, J.P. Observations on the fish and fisheries of Kangra valley and adjacent areas with special reference to the mahseer and other fishes. *J. Inland Fish. Soc. India.* 1971, **3** : 63-71.
7. Sunder, S. and Joshi, C.B. Preliminary observations on the spawning of *Tor putitora* (Hamilton) in Anjani stream, Jammu province during 1969. *Indian J. Fish.* 1977, **24**: 153-158.
8. Wood, H. Scottish herring shoals. Prespawning and spawning movements. Scotland Fish Bd. S. Invest. 1930, **1** : 1 - 71.
9. Sobhana, B. and B. Nair, Observations on the maturity and spawning of *Puntius sarana subanastus* (val.). *Indian J. Fish.* 1974, **21** : 357 - 368.
10. Dobriyal, A.K. and Singh, H.R. The reproductive biology of the hillstream carp *Barilius bendelisis* (Ham.) from Garhwal Himalaya. *Vest Cs Spolec Zool.* 1987, **51**: 1-10
11. Dobriyal, A.K. and Singh, H.R. Ecology of rhithrofauna in the torrential waters of Garhwal Himalaya, India: Fecundity and sex ratio of *Glyptothorax pectinopterus* (Pisces). *Vest. CS.Spolec. Zool.* 1989, **53**: 17-25.
12. Welch, P. S. Limnological methods. McGraw - Hill Book Company. INC, New York, London. 1948.
13. Hickling, C.F. and Rutenberg, E. The ovary as an indicator of the spawning period of fishes. *J. Marine Biol. Assoc. U.K.* 1936, **21**: 311-318.
14. Nautiyal, P. Mahseer the game fish (Natural history, status and conservation practices in India and Nepal. (Compiled and Edited). Rachna, Srinagar Garhwal. 1994.
15. Pathni, S.S. Studies on the spawning ecology of Kumaon mahseer *Tor tor* (Ham.) and *T. Putitora* (Ham.). *J. Bombay nat. Hist. Soc.* 1983, **79**: 525-530.
16. Desai, V.R. Reproduction biology and spawning ecology of *Tor tor* (Ham.) from river Narmada. In: Singh, H.R. and Lakra, W.S (Ed.) *Coldwater Aquaculture and Fisheries.* NPH, New Delhi, 2000, pp. 235-252.
17. Dobriyal, A.K., Rautela, K.K. and Rautela, A.S. Invention of a new index for the determination of sexual maturity in fishes. *Uttar Pradesh J. Zool.* 1999, **19 (2)**: 207-209.
18. Beaven, R.. *Handbook of Freshwater fishes of India.* London, 1877.
19. Thomas, H.S. *The Rod in India.* W. Thacker & Co. Ltd. 1897.
20. Mac Donald, A.S.J. Simple natural history of the Mahseer. In: *Circumventing the mahseer and other sporting fish in India and Burma.* Natraj Publishers, Dehradun, India. 1948, 16 p.
21. Desai, V.R. Ecstatus of mahseer in river narmada (Madhya Pradesh). In: Nautiyal, P. (Ed). *Mahseer the game fish.* Rachna, Srinagar Garhwal. 1994
22. Hora, S.L. Analysis of factors influencing spawning of carps. *Proc. Nat. Inst. Sci. India.* 1945, **11** : 303-311.
23. Khan, H. Reproductive powers and breeding habits of some fishes of Punjab. *Punjab J. Fish. Manu* 1945, **2** : 6-11.

24. David, V. Notes on the bionomics and some early stages of Mahanadi mahseer. 1953, *J. Asiat. Soc.Sci.*, 1953, **19 (2)**: 197-209.
25. Shreshtha, T.K. Spawning ecology and behaviour of Himalayan mahseer, *Tor putitora* (Ham.) in the Himalayan waters of Nepal. In : J L McClean, L B Dizon and L V Hossilos (Eds.): Proceedings of the first Asian fisheries forum, AFS, Phillippines. 1986, Pp. 689-692
26. Sunderraj, B.I. Reproductive physiology of teleost fishes- A review present knowledge and need of future research. *Aqua.Cult. Clev. Corrd. Programme. FAO, UN,Rome, ACDP-RAP-* 16. 1981.
27. Singh, H.R., Dobriyal, A.K. and Nauriyal, B.P. Spawning patterns and environmental regulation of spawning in hillstream fishes. In: Follett, B.K. et.al. (Ed.) *Japan Sci. Soc. Press Tokyo/ Springer- Verlag*. 1985, 1-11.
28. Dobriyal, A.K., Kumar, N., Bahuguna A.K. and Singh, H.R. Breeding ecology of some coldwater minor carps from Garhwal Himalay In : Singh, H.R. and Lakra W S (Ed.): *Coldwater Aquaculture and Fisheries*. NPH, New Delhi. 2000, Pp. 177-186.