SUMMARY

Tor putitora (Hamilton) were collected from Gobindsagar reservoir, during the period of June 1989 to May 1991, for the study of various aspects of its bionomics. Gobindsagar reservoir is one of the deepest reservoirs in India which came into existence in 1963 with the construction of Bhakra dam across the river Sutlej.

For morphometric analysis scatter diagrams were drawn between the independent and dependent variables. Regression lines were fitted by the method of least squares. In most of the body proportions, there is high degree of correlation showing that all the morphometric characters increase in direct proportion to each other.

Studies on the food and feeding habits revealed that Tor putitora in this reservoir is omnivore. Because of poor feeding intensity it is not possible to say that the fish has preference for any particular food. The maximum occurrence of decayed organic matter, followed by fish scales, bones and other parts, higher macrovegetations, insects, sand particles, insect larvae and crustaceans have been recorded.

The overall length-weight relationship has been
found to be:

\[ \log W = -2.2564 + 3.0959 \log L \]

\[ W = 0.005541 L^{3.0959} \]

The 'n' values of length-weight relationship in different months do not show any specific increasing or decreasing trend, hence, they cannot be employed for the determination of spawning season(s).

For growth studies scales, opercular bones and vertebrae have been used. Using student 't' test it is inferred that there is close relationship between the back-calculated lengths by using scales and vertebrae than between scales and opercular bones, and opercular bones vs vertebrae. As the values between the scales and vertebrae methods are more nearer, the use of opercular bones was not resorted to. The scales being easy to collect without damaging the fish body, these could be studied without much difficulty. So for further growth analysis the scales were used.

Linear relationship has been observed between total fish length and scale radius/opercular length/vertebral radius. In case of scale radius a correction factor of 1.0 cm. has been observed, whereas, no such correction factor has been observed in case of opercular length and vertebral radius, indicating that opercular bones and vertebrae are formed at the time of hatching.

The phenomenon of growth compensation has been
observed in age classes 4, 9, 10, 12 and 15. So it is evident that it occurred in the later age classes with the return of favourable conditions. However, quarterly analysis did show this phenomenon in earlier life.

The growth parameters have been calculated from the back calculated lengths using scale method. The specific rate of linear growth ($C_1$) decreased with the increase in age in this species except between age classes 14 and 15. The absolute weight increase ($w$) showed increasing trend with the increase in age. On the contrary, the values of the specific rate of weight increase ($C_w$) decreased with the increase in age, except in the age classes 11-12 and 14-15. The value of index of population weight growth intensity ($\Phi C_w$) and value of index of species average size ($\Phi h$) have been found to be 83.78 and 7.49 cm. respectively.

The growth constant data has indicated that there are 3 periods in the life of Tor putitora. Fish attains full sexual maturity at the age of 7 years and it does enter old age at 14. Condition factor ($K$) increased with the increase in size.

On the basis of ova diameter and gonado-somatic index it has been seen that Tor putitora has only one breeding season in August, although eggs are laid in batches.

From fully mature specimens the fecundity lies between 3,720 to 24,808 in size ranging between 46.00-61.00
Correlation coefficients (r) between log fecundity, and log total fish length, log fish weight, log ovary length, log ovary weight and log ovary volume have been calculated. It is concluded that fecundity depends upon the ovary volume and ovary weight as is evident from the higher value of correlation coefficient. The total fish length and fecundity shows that relationship between them is of the following order.

\[
\log F = -5.8542 + 3.5986 \log L \\
F = 0.000001398 \times L^{3.5986}
\]

The male to female sex ratio is 1:4.91.

Minimum theoretical harvestable size has been found to be between age classes 9 and 10, when the fish attains a length of 65.00 cm. Mortality rates have been calculated by Jackson method, and Chapman and Robson methods. No significant difference has been found between the two methods.

It is evident from the catch data that there is continuous decline in the catch of *Tor putitora* and other indigenous fishes from Gobindsagar. The reasons are the construction of Bhakra dam and introduction of exotic carps viz., *Hypophthalmichthys molitrix* and *Cyprinus carpio*. For the conservation of mahseer of Gobindsagar following suggestions are made:
Breeding grounds of *Tor putitora* in Gobindsagar should be declared as fish sanctuaries, proper use of fish ladders, artificial propagation of Mahseer by hypophysation, release of hatchlings, declaration of harvestable size as 65.00 cm. total fish length, and selection of fast brooders for breeding purpose from different places to check senility.