

## **Triploid Rainbow Trout (*Oncorhynchus mykiss*) for Better Aquaculture and Ecological Risk Management**

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**Abstract :** The rainbow trout (*Oncorhynchus mykiss*) is an exotic salmonid fish, well known for its fast growth, tremendous ability to thrive in diverse conditions, delicious flesh and hard fighting nature in Europe and other countries. Rainbow trout farming has a great potential for its contribution to the mainstream economy of Himalayan states in India and other temperate countries. These characteristics establish them as one of the most widely introduced and cultured fish across the globe, and its farming is also prominent in the cold water regions of India. Nevertheless, genetic fatigue, slow growth, early maturity, and low productivity are limiting the expansion of trout production. Moreover, farms adjacent to natural streams or other water sources are subject to escape of domesticated rainbow trout into the wild, which is a serious environmental concern as the escaped fish is subject to contaminate and disrupt the receiving ecosystem. A decline in production traits due to early maturity prolongs the culture duration and affects the profit margin of rainbow trout farms in India. A viable strategy that could overcome these farming constraints in large scale operation is the production of triploid fish that are sterile and more heterozygous. For better triploidy induction rate (TR), heat shock at 28°C for 10 minutes and pressure shock 9500 psi pressure for 5 minutes is applied to green eggs with 90-100% of triploidy success and 72-80% survival upto swim-up fry stage. There is 20% better growth in aquaculture with triploids rainbow trout over diploids. As compared to wild diploid fish, larger sized and fitter triploid rainbow trout in natural waters attract to trout anglers, and support the development of recreational fisheries by state fisheries departments without the risk of contaminating existing gene pools and disrupting local fish diversity. Overall, enhancement of productivity in rainbow trout farms and trout production in coldwater regions, development of lucrative trout angling and better ecological management is feasible with triploid rainbow trout.

**Keywords :** rainbow trout, triploids fish, heat shock, pressure shock, trout angling

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