

- Invited Paper -

TRANSGENESIS IN FISH : INDIAN ENDEAVOUR AND ACHIEVEMENT

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The first Indian transgenic fish was generated in 1991 using borrowed constructs from foreign sources. To construct transformation vectors for the indigenous fishes, growth hormone genes of rohu, *Labeo rohita* and catfish, *Heteropneustes fossilis* were isolated, cloned and sequenced; their fidelity was confirmed in prokaryotic and eukaryotic systems. A vector was constructed with grass carp β -actin promoter driving the expression of r-GH. Rohu eggs are large, fragile and swell 2-3 times, when fertilized. Hence they were amenable only for electroporated sperm-mediated gene transfer. Accordingly, the sperm electroporation technique was standardized to ensure 25 % hatchling survival and 37 % presumptive transgenics without suffering any deformity. Southern analysis confirmed genomic integration in 15% of the tested individuals (Ti) belonging to family lines 2 and 3; another 25 % of the juveniles (Te) were also proved transgenic but with the transgene persisting extrachromosomally for longer than 1 to 2 years, perhaps due to the presence of replicon in the vector. Transgenics belonging to different family lines grew 6-8 times faster than the respective controls. Difference in growth trends of Ti and Te within a family line was not significant. In the Ti family 3 remarkable growth acceleration was sustained for a period longer than 36 weeks but in those of family 2, it gradually decreased. All transgenic fishes including the rohu converted the food at a significantly higher efficiency. Barring the transgenic mudloach, all the other transgenic fishes consumed food at significantly reduced rate.

Keywords : Cloning and sequencing GH gene - Transformation vectors

- Gene transfer by electroporated sperm - Genomic integration
- Fast growing transgenic rohu - Reduced feeding rate
- Enhanced conversion efficiency