- Invited Paper -

PRESENT STATUS OF BIOTECHNOLOGY IN FISH AQUACULTURE OF KOREA

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Aquaculture has provided us with foods for human consumption in last decades and is poised to become an important source of marine protein that human needs in the future. This is because the capture fishing industry has peaked and is likely to decline as wild stocks are diminished. Introduction of biotechnology in the aquaculture industry is a recent trend to secure higher productivity in the industry, including the genetic breeding of the cultured finfish.

Chromosomes are an assembly of DNA which have functions in addition to the expression of genes. They are part of the machinery by which the cell ensures that its genetic information is both copied and delivered accurately to the daughter cells at cell division. The chromosome engineering applied in the aquaculture is based on the production of individuals from genetic materials of single parent such as gynogenetic diploid from female materials and androgenetic diploid from male ones.

Hybridization is to produce a genetically improved allopolyploidy which has complete sets of chromosomes from two different species. The successful production of the allopolyploidy is achieved from hybridization between Pralalichthys olivaceus and Verasper variegatus, between Haliotis gigantea and H. discus hannai in Korea.

A number of fish species have sexual difference in growing performance. Therefore, it is quite a reasonable to select a better growing side of sexes for better production if the growth difference is significant in a given species. The difference is species-specific. For example, females of Pralalichthys olivaceus grow faster over males, and vice versa in tilapia.

Production of gene-transferred fish has been one of the most interesting sectors in fish biotechnology since the start of 1990s. Thereafter, considerable parts of the subject have focused upon production of genetically improved fish and the results have been locally successful. For example, in 1994, Dr. Delvin and his colleagues produced a transgenic Atlantic salmon using a growth hormone gene from sockeye salmon, which grew about 30 times faster than wild one. Dr. Kim, collaborating with his colleagues, also produced super

mud loach under this technology in Korea. NFRDI is developing to produce a transgenic olive flounder using a growth hormone gene from spotted flounder.

Research in molecular breeding is focused on integrating genomics techniques into applied improvement of fish production. Recent progress in genomic technology permits the analysis of many loci which are related to quantitative trait. The molecular breeding uses this genetic information to augment measurements of important phenotypes to improve the efficiency of traditional breeding.