

CHARACTERIZATION AND CONSERVATION OF CARP GENETIC RESOURCES: PLANNED JOINT R&D ACTIVITIES BETWEEN HUNGARY AND VIETNAM

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World production of carp was 3.2 M tonnes in 2002 and China holds first place in this production. Common carp is one of the most important cultured freshwater fish species in the world. Its production is the second largest in Europe after rainbow trout in freshwater areas. Common carp production in Europe was 146,845 mt in 2004 (FAO Fishstat Plus, 2006). Common carp production is concentrated mainly in Central and Eastern Europe.

In Hungary common carp has been traditionally cultured in earthen ponds since late 19th century, following the sharp drop in catches from natural waters, due the regulation of main river systems. Different production technologies and unintentional selection methods resulted in big variety of this species. Just before the intensification of rearing technology and the exchange of stocking materials between fish farms (early sixties), landraces of carp were collected from practically all Hungarian fish farms into a live gene bank at Research Institute for Fisheries, Aquaculture and Irrigation (HAKI) at Szarvas (Bakos et al., 2006; Bakos and Gorda, 2001). In order to provide highly productive hybrids for production purposes, from 1964 onwards different strains and crosses between Hungarian landraces were created and tested. During the last 40 years approximately 150 two-, three and four line hybrids were produced. While developing parental lines, methods of individual selection, inbreeding, backcrossing of lines, gynogenesis and sex reversal were used. This breeding program resulted in three outstanding hybrids: Szarvas 215 mirror and Szarvas P31 scaly for pond production, while Szarvas P34 scaly for angling waters. Besides satisfying the needs of industry, the live gene bank helped to preserve the biological diversity of Hungarian carp landraces. Fifteen Hungarian carp landraces are maintained till today in the gene bank. Through exchange programs fifteen foreign carp strains were added to the collection, from Central and Eastern Europe, as well as from South-East Asia (Bakos et al., 2006).

Besides developing the methodology of live gene bank maintenance, a National Carp Breeding Program has been initiated in cooperation with all stakeholders in Hungary: National Association of Fish Producers (HOSZ), National Institute for Agricultural Quality Control (OMMI) and Research Institute for Fisheries, Aquaculture and Irrigation (HAKI). As a part of it, the methodology and technology of broodstock management and carp performance testing has been developed. Starting from mid nineties of last century this National Carp Breeding Program is being implemented successfully. Beside the live gene bank of common carp, a cryopreserved sperm bank has been set up and maintained at HAKI, Szarvas Hungary. Today 1/3 of the live gene bank is preserved in the Cryo-Bank of the Institute. Recently, priority is given to stress and disease resistance of preserved carp varieties in HAKI. The EU-financed Eurocarp project could be a framework for the planned cooperation between RIA-1 and HAKI.

In Vietnam, common carp is also commonly cultured species in freshwater areas. There are several locally available and introduced strains. The first attempts to improve growth performance of common carp were made in early 1970s to cross between locally available and introduced strains. The hybrids between Vietnamese white scale and Hungarian strains showed faster growth and adapted to locally aquaculture systems. Genetic

improvement of common carp has been undertaken for the last 20 years. Mass selection were made during 1985-1995. The initial materials used in the selection was three different hybrids derived from the Vietnamese white scale, the Hungarian scale and the Indonesian yellow scale of common carp. Under the project”Genetic improvement of carp species in Asia”, the breeding of common carp has been continued by using family selection. This family selection has been conducted since 1997. Growth of the 5th selected generation has increased 33% compared to that of the base population. The improved stock of common carp has been disseminated nationwide to fish hatcheries. Beside the live gene bank of common carp, a cryopreserved sperm bank has been set up and maintained at the National broodstock Center (NBC) of RIA-I. Recently under collaborative work between RIA-I and IoA, Stirling University (Scotland), several DNA markers has been developed to assist selection works of common carp.