

Management of Broodstock and Quality Control of Fish Seed in Hungary

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Abstract

Common carp (*Cyprinus carpio*) breeding has a long tradition in Hungary. However, recent economic changes in Eastern Europe and new developments in aquaculture necessitated the need for ensuring quality of the brood stock used in hatcheries and the legal and institutional frameworks needed to implement the program. In addition to good research and development programs and gene banking, it became essential to establish an appropriate legal framework, organize, coordinate and control breeding activities, and provide financial support. It was a major breakthrough for carp breeding when *C. carpio* was recognized as one of the cultivated animals in the Animal Breeding Act in 1993. The Carp Breeding Section of the Hungarian Fish Producers Association plays an important role in carp breeding programs. Thirteen breeding farms of the Carp Breeding Section have 24 certified *C. carpio* varieties. In Hungary, about 80 % of the seed used as stocking for commercial production are from high quality certified breeders.

Introduction

Breeding and cultivation of common carp (*Cyprinus carpio*) is the backbone of fish farming in Hungary. Sixty seven percent of the total aquaculture production (19 904 tons) was accounted for by *C. carpio* in the year 2000. *C. carpio* breeding has a long tradition in Hungary and its techniques have been known and applied worldwide in carp breeding programs. However, recent economic changes in Eastern Europe and new developments in aquaculture have necessitated the development of carp breeding programs that ensure quality of seed as well as the legal and institutional frameworks to support them.

Broodstock Management

The main elements of the efficient management and maintenance of broodstock in Hungary are the following:

- appropriate legal framework (Ministry of Agriculture and

- Regional Development);
- good research and development programs, gene banking (research institutions);
- quality control (National Institute for Agricultural Quality Control);
- efficient organization and coordination (Hungarian Fish Producers Association);
- financial support (Ministry of Agriculture and Regional Development).

Legal Framework

After the political and economic changes of the early nineties in Hungary, new laws and regulations were established to provide the appropriate legal framework for carp breeding programs. The main Acts and regulations relevant to carp breeding are the following:

- Animal Breeding Act (1993 CXIV);
- Ministry decree on approval and registration of breeding organizations (30/1994);

- Ministry decree on certification of breeders (31/1994);
- Ministry decree on the performance of progeny testing (32/1994);
- Ministry decree on the maintenance of indigenous species stocks (37/1994);
- Ministry decree on the operation of fish hatcheries (41/1994).

Research and Development

Research and development activities for a good national carp breeding program have been well established in Hungary, mainly through the activities of the Research Institute for Fisheries, Aquaculture and Irrigation (HAKI) at Szarvas, and the Saint Stephan University (SZIE) at Godollo. Broodstock management technologies have been elaborated and tested for many years and are now available for practical application. A live *C. carpio* gene bank (consisting of 17 Hungarian and 15 foreign strains and races) has been

in operation since 1962 in HAKI. The aerial view of the ponds for the *C. carpio* gene bank is shown in Fig. 1. Advanced research has been ongoing, with the cryopreservation of sperm, at both HAKI and SZIE. In-situ gene banking of wild carp strains such as the Tisza wild carp (Fig. 2) has also been undertaken.



Fig. 1. Ponds for gene banking and breeding at HAKI.



Fig. 2. Female brood *C. carpio* from River Tisza.

Quality Control

Quality control is an increasingly important activity in the management and maintenance of high quality broodstock. The National Institute for Agricultural Quality Control (OMMI) is the main institution in Hungary with responsibilities for quality control in fish breeding operations through the following activities:

- certify and control fish hatchery operations;
- certify high quality breeders (according to the Code for Carp Performance Test);
- certify and control the operation of registered carp breeding farms.

Breeding farms have to pay for most of the services of OMMI. However there is State support for the certification process of the high quality breeders from a special fund established by the Ministry of Agriculture and Regional Development.

Organization and Coordination

Efficient breeding programs and quality control cannot be accomplished without the appropriate organization of complex activities and coordination between farms and the relevant organizations and institutions. A breakthrough in the development of carp breeding programs and the improvement of broodstock management in Hungary was the establishment of the Carp Breeding Section within the Hungarian Fish Producers Association (HOSZ) in 1995. HOSZ encompasses more than 70 member farms, which account for about 60% of the total aquaculture production in Hungary. The Carp Breeding Section has 14 member farms that are registered as carp breeding organizations. These farms have their own carp varieties that are certified by OMMI. At present, the 13 breeding farms have 24 certified *C. carpio* varieties. Through its Carp Breeding Section, HOSZ organizes standardized carp performance tests, annual meetings, occasional expert consultations, and provides consultancies and other services. With the assistance of HOSZ and its Carp Breeding Section, broodstock nucleus comprising of 25 males and 25 females in each of the breeding farms are being marked with PIT tags since 2002 (Fig. 3).

Financial Support

The two-year carp performance

test, basic precondition for the certification of a carp variety is a major cost for breeding farms. OMMI contributes 50% of the total cost, using funds from the Ministry of Agriculture and Regional Development. The cost of the full two-year test for one carp variety is about US\$5 000. Special funds are also available for the maintenance of registered gene banks of indigenous carp varieties. The financial support is about US\$7 per breeder for up to 100 individuals of a recognized indigenous carp variety. Funds are also available for the improvement of the infrastructure and technical conditions for breeding activities. R&D funds are also used for breeding works and for the development of broodstock rearing technologies. It is becoming a common practice for farms and the research institutions to jointly apply for such funds and implement R&D projects together.

Carp Seed Distribution

Quality carp seed production is based on the use of high quality broodstock and good broodstock management practices as described above. All fish hatcheries in Hungary that produce seed for their own use and for sale are obliged to get the hatchery certified by OMMI. Certification also includes



Fig. 3. Marking a brood fish with PIT tag.

veterinary inspection and approval.

Fish farms that produce seed for their own grow-out can do it without complying with any special regulations on seed distribution. However, fish farms that sell the seed to other farms are obliged to produce the seed from certified breeders. There are 23 certified fish hatcheries in Hungary, most of them for carp seed production. These hatcheries propagate mainly the farm's own certified carp varieties. The hatcheries have to monitor the propagation and sales activities using standard forms issued by OMMI. They also provide a

Certificate of Origin when the seed is sold to another farm. The hatcheries are inspected occasionally by OMMI and they have to renew the certification of operation every three year.

In order to encourage the wide use of seed from certified breeders and to improve the production, only the fish farms that produce seed from certified breeders are entitled to apply for financial support from the FVM budget.

As a result of all these efforts aimed at the improvement of carp breeding, and thus for increasing of quality and competitiveness of the

carp breeding sector, about 80 % of the seed used as stocking material for commercial production are from high quality certified breeders.

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