

# Common Carp (*Cyprinus carpio*) Breeding in Nigeria

JOHN BARKER

## Introduction

The introduction of common carp (*Cyprinus carpio*) to Nigeria in 1952 coincided with one of the first attempts to culture fish commercially in that country at the newly constructed government fish farm at Panyam, in the central Jos Plateau region. This area, at an elevation of 1,400 m, has a near perfect climate for carp breeding and rearing, with seasonal temperatures very similar to parts of Europe. A cool winter period gives way in March to sharply pronounced warming: water temperatures rise quickly from an average of 12 to 20°C, providing perfect conditions for natural and controlled carp breeding.

The original common carp broodstock were brought to Panyam from central Europe, as 100-g fingerlings, by the "father" of the Panyam fish farm, an Austrian, K.K. Zwilling. They consisted of 50% fully-scaled and 50% mirror varieties, derived principally from the Dinkel Bula strain produced in Bavaria, Germany. Breeding of these fish was very successful and their progenies were soon to be found throughout Nigeria wherever fishponds were constructed. Government farms in the Western Region in particular

were notable for their development of aquaculture, with a specific concentration on the production of carp fingerlings for distribution to local farmers. In this, the work of the Rev. Dr. Elliot in Ibadan and Oyo was particularly significant during the 1960s and 1970s.

Nevertheless, it was apparent in 1980 during an FAO/UNDP project, that carp bred for commercial production had seriously deteriorated genetically, due to lack of any program of selective breeding from 1952. Consequently, in 1980 at the

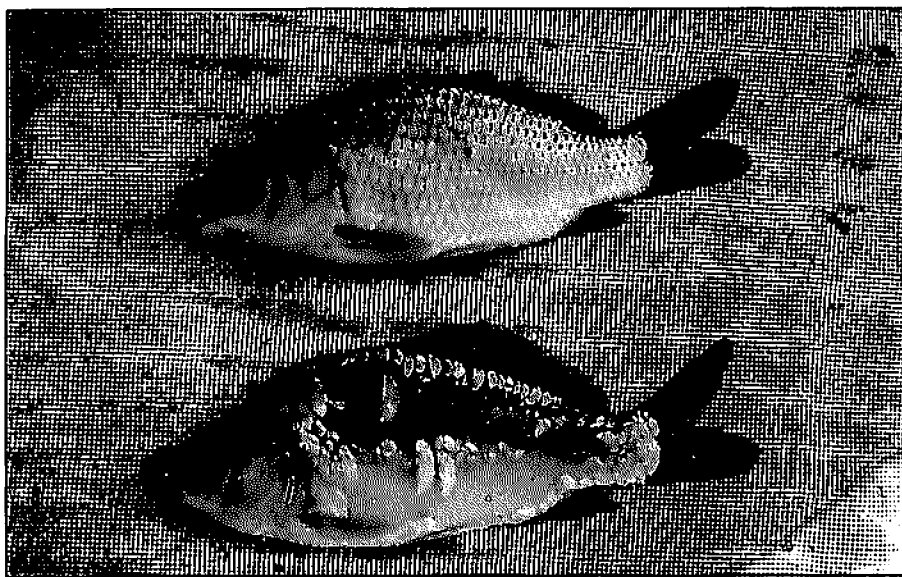
weight. By 1983, two isolated family strains of "Panyam Scale" and "Panyam Mirror" had been produced with selection of shape and growth rate as secondary traits. Subsequent work on these lines concentrated on growth and body shape as primary breeding goals.

At this time, a new private project, the Rockwater Fish Farm, was also set up on the Jos Plateau and continued the carp breeding work, taking broodstock from the Panyam strains as well as introducing "new blood" from the United Kingdom and from Israel.

Mixed male and female stock from a single mirror carp variety (Newhay) were brought from UK Males of the "w" strain (Dor 70) and females of the "פ" Yugoslav genotype were introduced from Israel. The "פ x w" offspring of these parents have been very successful in Israel carp culture.

## Breeding Programs

The UK mirror strain (Newhay) performed reasonably well, although growth rates were no better than those obtained from the Panyam strain. However, with its better body shape, the Newhay was crossed into the Panyam



*Rockwater scale (above) and mirror common carp (below) varieties.*

Panyam fish farm, the typical common carp resembled the wildtype. Nearly all the fish were fully scaled, with large heads and long thin bodies. A selective breeding program was started to produce again the Mirror form and also to improve the length/weight relationship and dressing

\*פ = Hebrew letter "rhet".

Mirror, giving rise to a fish with both superior growth and body shape over its parents. This variety is now named "Rockwater" and has rapidly become favored within the country.

The Israeli male "w" and female "n" parent stock are very different looking fish. The male is a fast growing yet "ugly" fish — dark, bigheaded, long-bodied and with rather irregular scaling — whereas the female, whilst having a slower growth rate, is beautifully colored, with regular scaling, a characteristic humped back and deep body. The progeny of the "n x w" cross looks like the female but has the characteristic fast growth rate of the male.

The excellent growth rates observed in the "w" and "n" parental stocks (2.5-3.5 g/day, 150-1,000 g) were strangely not replicated in their "n x w" progeny, stocked into commercial ponds, although growth rates of these fish were still at least as high as the local varieties. Their unexpected low growth rate (1.5 g/day) was observed in ponds fed with 25% crude protein pellets and chicken manure as well as in ponds fed with chicken manure and fresh brewery spent grains. All ponds were normally stocked at 1:1 ratios with common carp and tilapia (*Oreochromis niloticus*) at 2,500/ha each with up to 200 silver carp (*Hypophthalmichthys molitrix*) and 1,000 catfish (*Clarias gariepinus*) per hectare.

The growth rates of silver carp (7-11 g/day) and tilapia (2 g/day) were excellent for these environmental conditions and compare well with those from Israeli fishponds operated under similar conditions with respect to climate, stocking and feeding. The principal reason for the less than optimal growth rate of the carp was suspected to be competition for food by the more aggressive tilapia. Based on this assumption, pelleted feeds were fed at different points within the ponds from sites of chicken manure and brewery waste application. However, the author left the project in 1992 and the results of this investigation are not yet available.

Supply of the original broodstock from Israel of male "w" and female "n" means that, normally, expensive replacement of parentstock is required after six to seven years by the reimportation of new broodstock. However, a few male "n" did show up in the original female founder

stock fingerlings supplied and these have been crossed to produce "n x n" progeny which will be used for further breeding.

### Current Stocks and Future Directions

At the Rockwater Fish Farm in Plateau State, several distinct family lines are now maintained: Rockwater Scale; Rockwater Mirror; Dor 70 - males only "w" strain; Yugoslav male and female "n" strain; and Yugoslav "n x n" strain.


A program to cross the local Nigerian varieties into the imported Israeli stock in order to produce improved strains for pond culture in Nigeria was started in 1992 by crossing Rockwater x Israeli strains. It has also been suggested to backcross females of the "n x w" with the male "w" Dor 70 to produce and to propagate widely a line of "w" strain. The question remains as to the ultimate suitability of the Israeli varieties as breeding material in Nigeria. They were developed as fast-growing strains for high density situations and nutritionally high quality feeds, as in Israel. This is very different from the low level feeding with poor quality feeds, in ponds frequently stocked with competitive species found, as in Nigeria.

In recent years, it is known that several other introductions of common carp from Europe have been made to various private projects in Nigeria but their breeding history has gone largely unrecorded and carp breeding has not attracted much interest from research institutes. As of December 1992, the only active work being carried out on the establishment of family lines of common carp was at the Rockwater Fish Farm.

Introductions of grass carp (*Ctenopharyngodon idella*) and silver carp in the mid-1980s were well received and the two species have been rapidly accepted as desirable food fishes. The main research interests, however, have been in the development of indigenous fish for aquaculture; e.g., *Clarias gariepinus*, *Heterobranchus bidorsalis* and *H. longifilis* and also *Clarias* x *Heterobranchus* hybrids.

Common carp has become well accepted. Its oily flesh suits traditional cui-

sine. Therefore whilst development of semi-intensive polyculture systems suitable for commercial needs may, in future, tend towards those based on tilapia and catfish, the common carp will remain highly suitable and acceptable for use in community and subsistence farming ponds, as a result of its general hardiness and returns at harvest. Indigenous species may surpass common carp in market desirability and the development of some of these species for aquaculture is proceeding. Nevertheless, common carp in Nigeria should not only be maintained but vigorously developed at the semi-intensive commercial and subsistence projects. The carp lines produced so far have certain advantages over the original varieties and it would be of great value to build on this through further selective breeding. It is certain, however, that unless such programs are sustained, the production of common carp strains most suited for the culture techniques and environmental conditions in Nigeria will be difficult and the progress made so far will be lost.

Deliberate stocking of common carp into standing waters throughout the country, especially on the Jos Plateau, has been carried out by government for more than 20 years. At present, it is a species promoted by the Federal Department of Fisheries for aquaculture and is consequently distributed throughout the country in hundreds of fish farms, fishponds and standing waters. Grass carp and silver carp are recent introductions and at present are restricted to only three or four farms, but have been bred successfully at the Rockwater Fish Farm in Jos. A recent contract awarded by one state government for the supply of huge numbers of grass carp for introduction into river systems for water hyacinth control is viewed by the author with more than a little concern. A further farm in the southwest is known to have imported stocks of Indian carps including mrigal (*Cirrhinus mrigala*) and rohu (*Labeo rohita*) in 1991. 

**J. BARKER** was formerly with the Saudi Fisheries Company, Tilapia Farm, and now can be contacted at 6 Rowley Close, Botley, SO30 2FT, Hampshire, UK.