

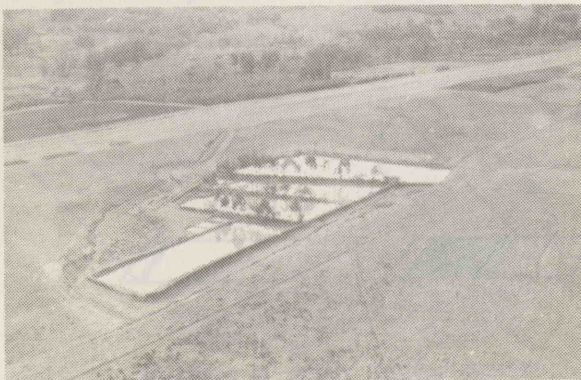
CARP BREEDING AND DISTRIBUTION

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INTRODUCTION

Fish provide a good source of protein but there are very few fish in the rivers of the Highlands and the people there live too far away from the coast to get fish from the sea. Because of this, the Department of Primary Industry has introduced fish farming to the Highlands. Fish farming projects start with small fish which are kept in ponds and looked after carefully until they are big enough to eat. This article describes work carried out at Aiyura where carp are bred for distribution to small fish projects.

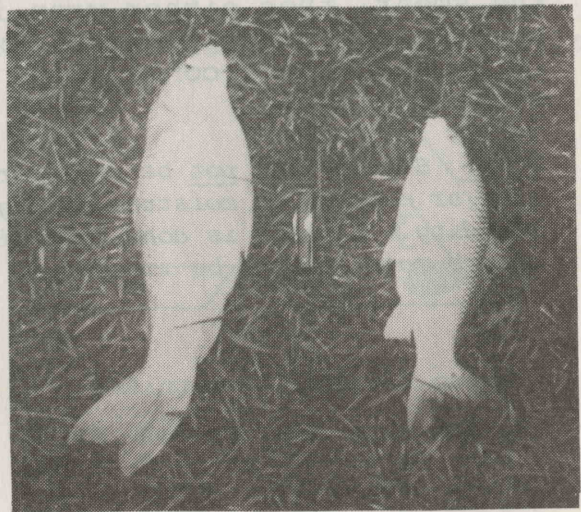
This work started there in 1956 when four carp ponds were dug. These ponds are different sizes but are all quite large in area. They measure 5 000 m², 3 000 m², 2 900 m² and 2 200 m² from the largest to the smallest. A number of smaller nursery holding ponds were built later, and these help to make fish distribution more efficient.



The carp ponds at Aiyura

TYPES OF CARP

Two varieties of common carp (*Cyprinus carpio*) are being bred at Aiyura. One is Golden carp and the other is Cantonese carp. The Golden carp is bright orange to golden in colour. When mature, it is about 60 cm long and normally weighs 3 to 5 kg. Some specimens up to 35 kg have been reported, but there have not been any that big at Aiyura.



Golden
carp

Cantonese
carp

The Cantonese carp is smaller than the Golden carp. It is a greenish-black colour on the back, fading to silver or white on the belly. The two types are therefore quite different in size and colour.

This article was first published as
Highlands Agricultural Experiment
Station Technical Bulletin No. 10.

FEEDING AND CARE

Although carp are omnivorous (feed on plants and animals) and eat anything of a suitable size, they prefer small animals and require a balanced diet, including protein. In an ordinary pond, they get a variety of food, mainly made up of very small animals (plankton) suspended in the water. The small fry (very young fish) mainly just eat this animal plankton, but fingerlings (older fish about the same length as a finger) and adults will take nearly anything, including fairly large insects. Carp can nibble at very large pieces of food although they have not got any teeth.

The amount of plankton in a pond can be increased by applying fertilizer which the plankton feed on. Any suitable manure, green or animal, may be used. The aim is to provide plenty of healthy plankton. The animals in the plankton cannot be seen without a microscope because they are so small but when a lot of them are present, the water looks green. Generally for carp ponds, the greener the water the better.

The carp can be helped to grow faster by feeding them directly as well as by increasing the amount of plankton. To grow quickly, the carp require protein. Insects are probably the cheapest and most available protein source. They can be collected in an insect trap made by hanging a night light over the pond.

Sweet potato contains little protein and is a very poor food for carp. It is only useful for fattening large fish just before killing.

Temperature is particularly

important. Carp may survive between 2°C and 32°C, but they feed readily only above 12°C and below 27°C.

BREEDING AND DISTRIBUTION

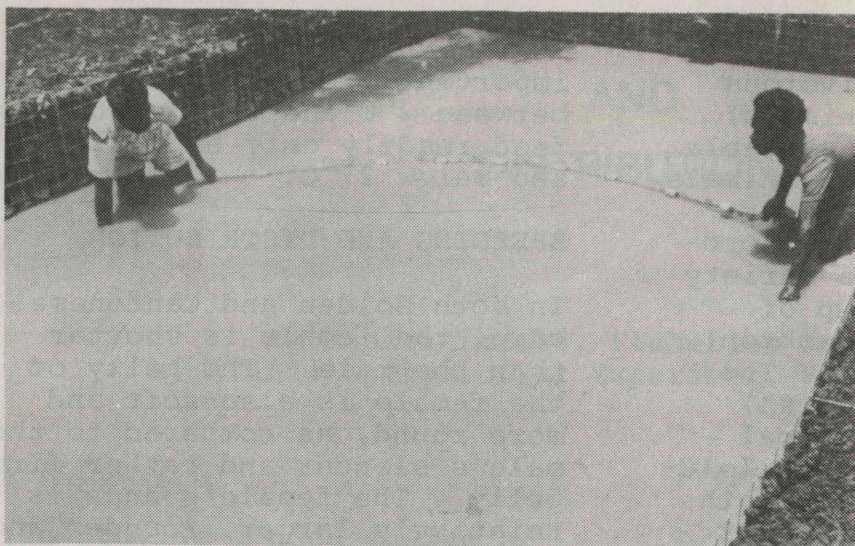
In both Golden and Cantonese carp, the female is shorter than the male. The belly of the female is also soft and more round, as compared to the male's slender and rather firm belly. The female's anus is relatively larger, rounder and flatter than the male's which is slightly pointed and rather small. If a light pressure is applied on the belly towards the anus, nothing appears in the female except, sometimes, a few eggs. In the male, on the other hand, a milky fluid (milt) is produced.

During the breeding season, the female swims restlessly about and a swollen patch without scales appears around the anus. At this time, the male follows the female around.

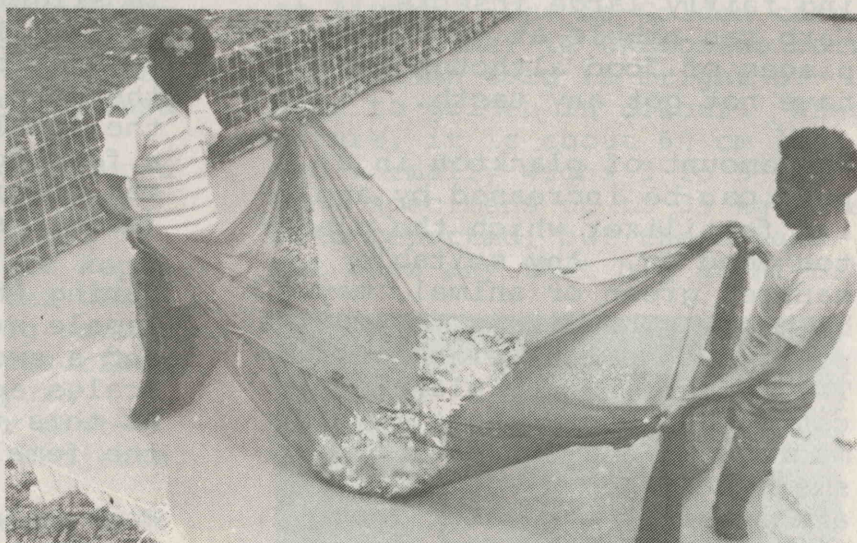
Each main pond at Aiyura has plenty of sedges and rushes growing around it for the females to lay their eggs in.

Every 3 or 4 months, one of the four main ponds is drained and about 2 000 new fingerlings are transferred to the nursery ponds. The nursery ponds are small enough to make it easy for the fingerlings to be netted again for distribution. The breeders are also transferred to a nursery pond until the main pond is refilled, when they are put back.

When fish are wanted for a project, they are sent away in water contained in plastic bags inside cardboard boxes. The bags are sealed in such a way that a good supply of air



Carp fingerlings are



netted for distribution

is available to the fish. When possible, the water is also saturated with oxygen which helps to keep the fish alive longer. The fish are transported by road or air, and survival is usually good.

PROJECT FISH PONDS

If a fish pond is looked after properly and if the fish are fed well, a pond should be able to grow one fish for every 7 to 8 square metres.

The recommended minimum size for a pond is 400 square metres. Examples of the measurements of a pond of this area would be 20 m x 20 m, or 25 m x 16 m.

The depth of the pond should be 1 metre. If it is deeper than this, there are two main complications. Firstly, not enough light reaches the bottom of the pond. Secondly, the water on the bottom does not get enough oxygen and becomes stagnant.

It is worth mentioning that the pH of pond water has a direct effect on carp production. The pH scale is a method of measuring the acidity or alkalinity of the water. The pH scale runs from 0 to 14. Below 7 is acid, 7 is neutral, and above 7 is alkaline.

Water with a pH of less than 4 or above 11 will kill the fish as soon as they are put in it.



Saturating water in plastic bags with oxygen. The fish are already in the water inside the bags and will be transported as soon as the oxygen has been applied.

Water with such a low or such a high pH is not often found naturally. Usually, the pH of surface water used to fill fish ponds is satisfactory.

ADVISORY WORK

The fisheries assistant at Aiyura co-operates closely with extension officers in a number of provinces in advising and assisting in carp projects. Before any fish are sent to a project, the fisheries assistant goes to visit it to make sure that the ponds have been built properly. This means that any faults can be corrected before the fish arrive and so the chances of the project being successful are increased.

Carp are now becoming quite popular in the Highlands and in Morobe Province as a good source of food which requires little extra work once the ponds are built. Over 30 000 fingerlings were sent out from Aiyura to carp projects last year. Projects were also started in the East Sepik and Central Provinces.

Further information on starting carp projects can be obtained by writing to the O.I.C. of the Highlands Agricultural Experiment Station, Aiyura, P.O. Box 384, Kainantu, E.H.P.