The Sharptooth Catfish (*Clarias gariepinus)*

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Introduction

Although the sharptooth catfish or barbel, *Clarias gariepinus,* is an indigenous fish species in South Africa, it is not native to the Western Cape. The sharptooth catfish's natural distribution range is from the Orange River catchments area, northwards, to the Nile River. However, this large and hardy predator is so adaptable that it is able to survive in virtually any river or dams in Southern Africa, outside its natural distribution area. During the 1960s sharptooth catfish were introduced into the Eerste River, and rapidly spread to other rivers and dams. They now occur in most of the wetlands on the Cape Flats.

Most people have never tasted catfish. Although this fish is widely available in supermarkets in the States, many people still think of catfish as those ugly creatures lurking in the depths of muddy southern rivers. Nothing could be further from the truth. Farm-raised catfish, like chicken and beef, are grown under the most rigorous quality-controlled conditions. Farm-raised catfish are the result of years of study and experimentation. They are grown in clean, fresh water, fed a diet of grains, harvested alive, and transported in aerated tanks to processing plants.

Catfish are lower in calories than most meat products and have lower cholesterol content than most other fish. They are a good source of protein, potassium and thiamine, yet they have low sodium content. In other words, catfish are among nature's most perfect foods, and they are delicious too!

History of catfish production in South Africa

The rise and fall of the catfish industry in South Africa has been well documented and needs no repetition. The reasons for the fall need to be emphasized. Firstly, there was the marketing problem. Many producers produced catfish without having identified a market and ended up with fish that they could not sell. Some producers sought markets overseas. These markets all required an excess of 1 000 tones of catfish per month – more than what was being produced by all the catfish producers in South Africa at that period. Secondly, high production costs (mainly feed costs) resulted in a product that was too expensive for the local market.

It is therefore very important that any potential producers need to find and identify their market first of all. They also need to know what price they will be receiving for their product, as this will influence the type of production system that they will be using, i.e. from extensive (fed on waste material) to intensive (fed on highly balanced artificial diets).
Another problem that was identified is that many potential producers are under the impression that there is a direct correlation between animal production and aquaculture. The two are not correlated and both have unique management requirements. Aquaculture is a high-risk industry and you need to know your species and be well qualified to make a success.

Water quality requirements for *Clarias gariepinus*

Water quality is the most important factor for the successful implementation of an aquaculture venture. The requirements are dictated by the future size of the unit planned.

O_2 > 3 ppm	NH_4 < 8.80 ppm (pH 7)
ºC 20 – 30	NO_2 < 0.25 ppm
pH 6.5 - 8	NO_3 < 250 ppm
N_2 < 102 %	Cu < 0.03 ppm
CO_2 < 15 ppm	Zn < 0.0006 ppm
NH_3 < 0.05 ppm	Salinity < 15 000 ppm

Hatchery Requirements

The objective of a commercial hatchery is to produce the maximum number of healthy fry in as short a time as possible. Efficient larval or fry rearing depends on feed quality and ration, feeding frequency and the provision of optimal environmental conditions as well as on the experience of the hatchery manager and personnel. It is not possible to give a specific design of a hatchery, as the situation on each farm is unique. However, there are specific requirements for a hatchery that will be discussed.

1. Area required:
   Enough for facilities, protection of water supply, future expansion, treatment of effluent, future water re-use and re-circulation systems. Sufficient elevation between water source and production facilities for aeration and gravity flow.
2. Water quality:
   The most important factor: Source- lake or reservoir water is preferred over stream supply. Remove wild fish, predators, parasites, diseases etc. If water is to be used from one of these sources, additional filters will have to be installed to remove these potential hazards.
3. Temperature:
   Special mention should be made of the temperature requirements of the catfish. The growth of the catfish is directly linked to the optimum temperature. Catfish will grow 3-5 times faster at 25 ºC than at 9 ºC. At a temperature between 28-30 ºC growth is at an optimum.
4. Buildings:
   Arrange the buildings in such a manner as to expedite work. Remember the potential of solar energy. Try to insulate the walls. The following “rooms” are recommended in a standard hatchery: hatchery/tank room, incubation area, feed storage, material storage, staff room, toilet facilities and a small office area.

Breeding and Larval Rearing Tanks

Various types of breeding and larval rearing tanks are suitable for the hatching and rearing of *C.gariepinus*. The eggs of catfish become adhesive soon after fertilization. The eggs are normally placed in a mono-cell layer on a suitable medium. This medium must allow for water flow over the eggs, as this ensures sufficient oxygen and removes metabolites. The use of 1 mm mesh as restraint for the eggs is preferred, as the eggs adhere to it and yolk sac larvae are able to pass through. The water normally flows over and through the nets at a rate of 1-3 l/min. Healthy developing eggs have a translucent green-brownish colour, but white eggs are infertile. If a large

percentage of the eggs are infertile, it is recommended that the batch be removed and destroyed. Depending on the temperature of the water, it will take between 20-57 hours for the eggs to hatch.

The water inlets and outlets of the rearing tanks will be determined by the system used. A flow through system will have adjustable water inlets and outlets that flow into a central channel and leave the building. If a re-circulating system is followed, the outlets will flow into a central channel, which should flow into the various filters and return to the tanks.

Various water-heating methods are also employed. Each method has merits of its own. The environment (house) can be heated, individual tanks can be heated or the common water source (flow-through and re-circulating) can be heated. Various heating methods are used from solar radiation, geyser heaters, heat exchangers, steam, hot air, etc. Depending on the intensification of the breeding and fry production system, additional aeration may be required in the hatchery.

The hatching or rearing tanks can be made from various materials, e.g. concrete, asbestos, plastic, fibreglass, etc. Iron and copper should not be used. The volume of the tanks also varies between 500-2000 litres. The depth of the tanks should be below 700 cm. Gutters have also been used for the hatching/rearing of larvae. The major requisites of the hatching/rearing container are an adjustable water inflow and protected outflow. The stocking density will be determined by the water exchange rate maintained. Remember to remove shooters for their cannibalistic behaviour.

Catfish Ponds

In the Philippines, research has shown that for integrated systems, ponds must be at least 1000 to 1500 m^2 to be economically viable. The actual size of the ponds will depend on the size of the farming enterprise, the type of production followed, i.e. from extensive to intensive, and the amount of available water. Fingerling ponds are small for better management. For semi-intensive production systems, ponds will be larger in size (1-5 ha) and have a lower stocking rate of 20 000 fish per ha.

Good luck
Henk