Stock a known weight and number of brood fish in existing tanks at least 72 hours prior to induction. Stock separate tanks to avoid damage during the induction time. Keep fresh clean water flow through the holding tanks and cover with nets to avoid them jumping out. Ensure the tanks are smooth enough not to bruise the selected stock.

1. Broodstock holding tanks should be covered with a net or any material which will allow continuous air circulation.
2. Where possible keep water flow through.
3. Adequate water level must be maintained.

Inducing females with pituitary hormones

There are two types of hormones:

1. Synthetic, already made for use.
2. Natural, extracted from fish (catfish, mirror carp, tilapia), on-spot extraction from catfish by sacrifice.

Pituitary hormone extract

1. Kill the fish with a gentle blow on the head or put it to sleep under the influence of anesthesia.
2. Separate the lower jaw from the upper jaw.
3. Wash the skull free of blood.
4. Open the skull from the ventral region.
5. The pituitary is exposed as shown in the image.
6. Pick and crush in normal saline water (1-2 ml).

Enterprise budget for establishing & operating a medium scale catfish hatchery in Uganda

<table>
<thead>
<tr>
<th>ITEM DETAILS</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>RATE</th>
<th>TOTAL</th>
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<td>Gross stock (kg)</td>
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<td>Total fixed cost</td>
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<td>Feed &amp; Fish meal</td>
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<td>Land &amp; facility</td>
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<td>Total variable cost (TVC)</td>
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<td>Net Return</td>
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</table>

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Introduction

African catfish seed production and hatchery management

A typical production cycle for African catfish farming begins with the selection offingerlings or juvenile fish of good quality for broad stock development. Fish are selected from a family of grow-out stock based on records of the origin, age, strain and performance history of the parents or the wild. In this brochure, we explain the basic steps and requirements a farmer needs to follow in order to achieve good results in the hatchery.

Preparation of brood stock development, conditioning and management facilities

Earth ponds are the most frequently used facility for broodstock development and conditioning in Uganda. Concrete tanks are currently utilized for temporary holding especially on the spawning day. In circumstances where a brood fish bigger than 1kg in concrete tanks, it is advisable to use or reinforce the bank with clay soil in order to prevent the fish from rubbing its belly directly on the rough concrete surface.

Brood stock development and conditioning facility should be of the following qualities:

- Appropriate size, so as to enable adequate management practices to be effected. Ponds between 200 to 1,000m² enable feeding and uniform growth and gonad development. Very small ponds (<100m²) will require the farmer to have several of them. Too big ponds are not good because of the difficulty to ensure uniform feed distribution and hence poor quality of the eggs and sperm.
- Water depth in brood stock ponds should be at least one meter and not more than two meters. Too deep ponds make the fish spend a lot of energy swimming up surface to feed at the expense of gonad development. Too shallow ponds will expose the stock to walking bird predators and constant temperature fluctuation.

The texture of broodstock pond bottom sediments should be smooth especially made ofclay to prevent the fish from belly bruising.

Restrained inlet, outlet and the surface are important in catfish conditioning facility to prevent intrusion of fish from unknown sources as well as preventing the stock from escape and jumping out.

Label the systems to provide identification and contents of what is being held. Clean environment free from bushes. The supply and drainage systems have to function properly so as to enable free flow of water and prevent flooding and possible escape of fish.

Conditioning the pond by liming using calcium hydroxide. The liming rate depends on the pH of the soil but the commonly used rate in Uganda is 0.1kg/m². Liming helps to stabilize the pH, disinfect and stimulate natural food development in the pond.

Monitoring physical-chemical and biological water quality parameters in the system.

Stocking density during conditioning

Figure 1. An example of a well maintained broodstock pond

Stocking rate is 1kg/m², about 0.5kg body weight/m² in ordinary pond condition where there is no artificial aeration.

Feeding & feeding management:

Sinking feeds are better for catfish broodstock because of bottom nature at that stage. Use feeds with crude protein ranging from 35-55% and less fat content.

Feeding has to be done at least twice a day between 7am to 9am and 12pm to 2pm. Apply stimulants such as noise or thumping the ground frequently from the usual feeding point. Conditioning process takes between four to six weeks of intensive management to produce the best results.

African catfish spawning process

When the spawners are ready (running males and females), a spawning program can be organized and the following preliminary activities have to be considered:

- The target number of fingerlings to produce
- Available space (hatching, nursery and grow-out facilities)
- Weighting and nursery feeds (larval weaning, fry and fingerling rearing)

Organizing the hatchery for spawning

- Prepare a checklist of materials and requirements that you will need during and after spawning.
- Check the worthiness of the hatching, nursery and holding tanks.
- Check status of the aeration system.

Harvesting and selection of broodstock for spawning

When indoor hatchery unit is prepared, male and female brood fish are selected in a ration of 2:1 from the lot in the conditioning pond using the right procedure and facilities. Reducing water level if sine netting is to be done. Harvest brooders using broodstock scoop net into plastic buckets. Weigh females to determine the male biomass to use for induction and fertilization of the eggs. Sex ratio 1:1.

Species and criteria for selection of broodstock for spawning

L-R: Male and Female African catfish brood stock.

- Bulging belly that oozes ripe eggs on gentle thumb pressure.
- Sunked gonad papilla
- Elongated belly with protruding genital papilla and no gametes on gentle thumb pressure along the belly.