

Current know how and possibility for growout culture of an endangered catfish, *Horabagrus brachysoma*

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A haul of Horabagrus brachysoma fingerlings ready for pond stocking.

The contribution of freshwater aquaculture produce in India is noteworthy. Indian major carps are still at the head of production and fish production is projected to reach about 12 million tonnes by 2020. Hence there is an urgent need to utilise modern techniques for production over the traditional methods, increase productivity and to diversify species and systems. Minor carps, medium carps, catfishes and air-breathing fishes present opportunities for the diversification of aquaculture. Some varieties of carps and catfishes have low growth potential, but still retain marketing scope as there is a trend of eating whole fish fried or in curries. *Horabagrus brachysoma* is one such catfish, which has immense demand among the consumers. Even though its production is limited,

success has been registered after overcoming various technical problems involved during its production. The article communicates the culture practices of this catfish in captivity.

Why *H. brachysoma* considered as a potential species for aquaculture diversification?

- Very few fish species other than this catfish have dual importance as both ornamental and food fish.
- It adapts well to freshwater and matures in captive conditions.

- Size variation among the population during captive rearing is a usual phenomenon in many catfishes, but *H. brachysoma* tends to exhibit homogenous growth at different life stages.
- Catfish feeds usually contain fish meal as an important ingredient, which escalates the cost of production. However, *H. brachysoma* is omnivorous in nature and can be fed well with the feed prepared from plant ingredients also.
- Many catfishes have low fecundity (*Clarias batrachus*, *Mystus* sp. and *Ompok* sp.). This is considered as one of the major constraint in fish during their seed production in a hatchery. But *H. brachysoma* is a highly fecund species.

Seed production: A prerequisite for culture

It is not easy to get stocking material from nature to start aquaculture of any species. Hence, it is essential to depend on hatcheries to produce the desired size and number of seed for growout. The process involved in hatchery production of *H. brachysoma* seed is briefed here.

The broodstock can be raised in earthen ponds or cement cisterns with compound feed containing 30-32% protein to get a suitable size of 80-100 g fish for induced breeding. Morphological identification of male and female is only possible during its spawning season (July-August), when

the bulging abdomen of females and free flowing of milt of males is observed respectively. Female fish need a single injection at the rate of 1-1.5 ml Ovaprim per kg body weight, which renders them suitable for stripping after 12-13 hours post-injection. The incubated eggs hatched after 21-22 hours. Mixed zooplankton is one of the best foods for the larvae during their rearing from the fourth day onwards until fry stage. The fry are further reared for 3-4 months to reach fingerling size, ready for stocking.

Pre-stocking management

Pond size and environment

Either earthen ponds or cement cisterns are suitable for growout of this catfish. Pond sizes usually vary depending on the seed availability. As this fish does not perform well at high density it is better to opt for a medium size pond of not less than 0.04 ha. Cement cisterns can also be used to raise marketable fish, but the fish grow less efficiently compared to pond conditions. Hence the fish take more time to reach harvestable size. Water quality parameters such as pH, alkalinity, dissolved oxygen, ammonia of the pond should be within 6-8, > 120ppm, > 5ppm and < 0.05 ppm respectively for optimum growth and survival.



Harvested fish ready for marketing.



Fingerlings released in pond for grow-out culture.

Pond preparation

Pond preparation is essential to provide optimal conditions for higher growth, survival and yield. Hence the perennial ponds must be weed free and dewatered to ensure a predator free environment. Seasonal or dewatered ponds should be manured to generate natural food in the pond system. Usually ponds should be fertilised with raw cow dung (10-15 tonnes/ha), single super phosphate (200 kg/ha) and urea (200 kg/ha) for plankton bloom. Even though the culture is feed based, the fishes efficiently utilise the natural feed for their growth and survival in many occasions. Hence, initial pond fertilisation is enough rather than a repeated fertilisation as in carp ponds.

Size of seed

The size of seed plays an important role in growth and yield during the culture period. The possibility of lower growth and survival as well as enhanced culture period cannot be ignored if the lower size of the seed is stocked. Hence it is always advisable to stock seed of around 10 g seed in culture ponds, which also avoids early mortality during post-stocking.

Stocking of seed

Fingerlings are usually brought from outside sources or produced on the farm, while stocking the culture pond. It is essential to ensure that the seed are healthy and free from stress. It is often found that the seed accumulates stress during transportation. As this catfish accumulates stress easily, the seed should be acclimatised in the pond environment for quite a long period to get rid of stress before their release in the pond. It is advised to undertake water exchange as well as aeration during transportation. A lot of mortality is usually encountered if they are released immediately after transportation. It is always beneficial to undertake transportation or stocking of seed during the early hours of the day to curtail mortality. The production of a pond depends on the growth, survival rate and on the number of fish stocked. Simultaneously the growing period is also another important factor. As this catfish grows slowly, it is always recommended to stock at a lower density such as 30,000-40,000/ha or even less to achieve a marketable size in short period. We have observed that this catfish readily accepts feed supplied from the upper, middle and lower layers of the water column. Hence monoculture of this fish is preferable rather than co-culture with other varieties such as carps due to its active feeding habit, which would affect the growth of other co-cultured fish species.

Post stocking management

Feeding

Even though the fish utilises the limited natural food from the pond, it is essential to supply compound feed for growth during the culture period. Less expensive feed made from plant ingredients is usually fed due to its omnivorous feeding habit, to reduce the cost of feed. This fish readily accepts sinking, slow sinking and floating feed types. 1-2 mm floating pellets containing 30-32% protein at the rate of 2-3 % body weight is sufficient enough for the growing fish. Floating feed has the beneficial effect of assisting farmers to gauge the consumption pattern, utilisation, acceptability of feed and activeness of fish during feeding. This is also helpful to curtail the ration size during winter months and facilitates health management if at all required during the operational period.

Environment management

The culture environment deteriorated due to accumulation of metabolites and unutilised feed material. Mostly, water quality parameters such as dissolved oxygen are seriously affected, apart from ammonia accumulation during the culture activity. This is usually seen in cement cisterns while undertaking grow out activity compared to pond condition. Mortality of fish due to asphyxia is usually observed during the early morning. Hence it is essential to exchange water intermittently to give the optimum environment for their growth and to avoid the fish loss.

Health management

Incidence of disease is often found during the winter season or during the shifting of winter to summer. Diseases such as fin rot, ulcers/red patches near the tail or on the body are found. These can be controlled by frequent water exchange at the beginning of incidence. It is better to segregate the affected fishes, to restrict further spread of disease. Usually before the incidence, fish show slow swimming and feed poorly. Hence it is essential to take care of environmental management to restrict the incidence of disease.

Harvest

It is better to go for monoculture of this species as it shows vigorous feeding behaviour and may apply pressure on other species. Culture at low stocking densities yields better fish

size compared to high stocking density even though the hectare production is low. Fish of 50-60 g are highly preferred by consumers as there is a habit of eating single fish in the dish.

There is ample opportunity to culture this catfish in cement tanks or ponds. The growth of fish always remains low during cement tank rearing compared to pond culture, about 15-20 g in average weight. The higher growth in ponds might be due to the availability of natural feed and their utilisation by the fish. The growth and yield patterns of this fish have been evaluated at different densities, which indicated that up to 40,000/ha are good enough to produce marketable fish within a years' time with a production range of 1.5-2.0 t/ha. The yield can be enhanced at higher densities such as 50,000/ha, but this may result in small fish. In this situation, the culture period can be increased to harvest larger fish. But farmers generally prefer to reduce the culture period to lower risk.

The time of stocking may be another management aspect to get better growth or yield in this fish. The required size of fingerlings is only available just prior to the winter season. So the growth of fish is hampered accelerates only when the water temperature reaches around 27-28°C. Hence the stocking of fish should be so adjusted that the fish gets more growing period for higher growth.

Better management practices

- The fish should not be cultured with multi-species as it shows active feeding behaviour, which may restrict growth of other species.
- As the fish grows slow, it is better to culture it at a low density to achieve marketable size in a shorter growing period.
- The culture of this fish emphasises the stocking of larger, stress-free fingerlings to benefit growth, survival and yield.
- Good oxygen levels in the culture environment must be ensured during morning hours to avoid asphyxia, which may lead to mass mortality.
- Floating feeds containing 30-32% protein must be provided for optimal growth and to facilitate monitoring of feeding and ration size during the culture period.

Accelerated poverty alleviation of tribal households - cage fish farming by displaced fishers in reservoirs of Jharkhand

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Jharkhand, a new Indian state created in 2001 presents a unique culture, demography and geographical characteristics. Around 28% of the states 33 million people (2011 census) are tribal, forming a group in the state. Agriculture is the predominant livelihood for rural communities and subsistence level farming dominates the food production system, with limited opportunities for on-farm employment to landless people for the greater part of the year. There is limited scope

for labour movement in search of employment, particularly in tribal and hill areas where road and communication networks are limited. However, fisheries and aquaculture are regarded as an integral part of food production system and livelihood for over 135,000 people who are dependent on fishing and related activities, with major participation of tribal fishers.