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Intelligence

# Pirarucu show promise for cage culture in Amazon region

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## Reliable seedstock, feed supply needed to grow world's largest freshwater scaled fish



Pirarucu, *Arapaima gigas*, at 50 cm.

The pirarucu or Brazilian freshwater cod (*Arapaima gigas*), an endemic fish species from the Amazon River basin, is the largest freshwater scaled fish in the world. It can reach up to 200 kg in weight and 3 meters in length. Without intermuscular bones, pirarucu fillets have good flavor and enjoy high acceptance in Amazon fish markets.

Experimental and pilot husbandry of this hardy fish in confined enclosures has produced encouraging results. Initial research work was carried out at the Centro de Pesquisa Agroflorestal da Amazônia Oriental from Empresa Brasileira de Pesquisas Agropecuarias in Belem, Para, Brazil in the 1980s. Pirarucu

grown in excavated earthen ponds and fed with forage fish (tilapia) reached a mean weight of 10 kg in one year and a total productivity of 10 ton per hectare per year.

## Developing intensive husbandry

The Amazon basin has a variety of water bodies suitable for different types of fish culture systems. The current challenge is to develop an intensive husbandry system for pirarucu that increases stocking densities while maintaining high water quality standards.

Pirarucu have a positive aggregated behavior and do not exhibit cannibalism among animals up to 5 kg, which facilitates their husbandry at high stocking densities. Unlike other species with an obligatory aquatic respiration, their remarkable aerial respiration capability also allows the species to be confined under high densities, particularly in cages.

## Cage culture

Floating cage culture is an effective and economically viable fish production technology applicable to many aquatic environments. Cages confine aquatic organisms, provide adequate water quality and growth conditions, and easy feed management. They also protect against predators and competing animals.

Production of pirarucu in floating cages appears to be a viable alternative that can be implemented by small enterprises such as family businesses, or scaled up to a highly intensive commercial scale.

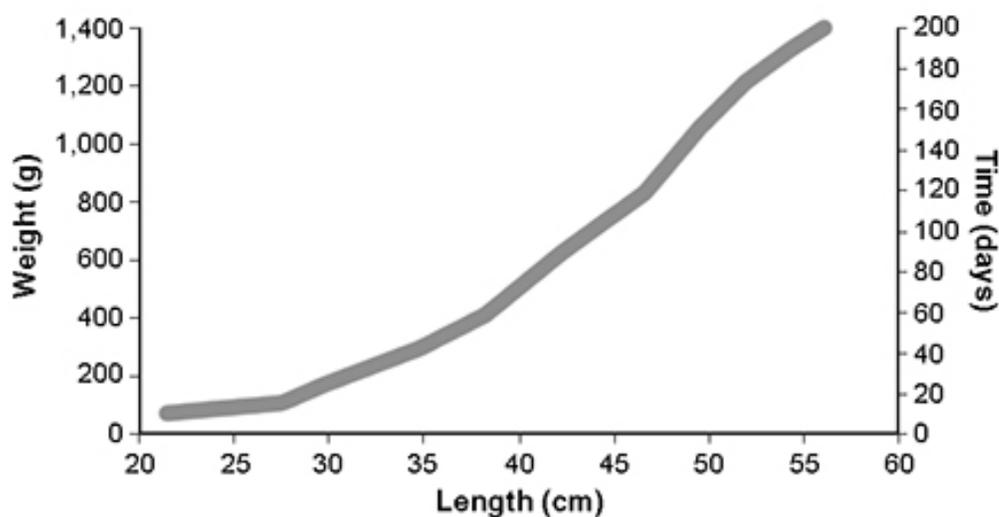


Fig. 1: Length-weight relationship of pirarucu juveniles in small-volume cages.

Cage size is an important factor in pirarucu husbandry, because initial growth in this species occurs primarily in length and over a very short time period (Fig. 1). Limiting the space inside the cages makes it difficult for the fish to swim, access food, and fully reach their growth potential. Cages of 1 cubic meter are appropriate for initial grow-out of pirarucu, until fish reach around 1 kg and/or 50 cm length. Pirarucu juveniles grown in these cages at high stocking densities up to 25 animals per cubic meter have had feed-conversion rates under 1.0 (Fig. 2).

Larger, 18-cubic-meter (3 x 3 x 2 m) cages are recommended for further grow-out. The initial stocking biomass in these cages can be around 10 kilogram per cubic meter. In a one-year period, the fish can reach an average weight of around 15 kg and a productivity of 150 kilogram per cubic meter. These preliminary results show potential for pirarucu production in confinement.

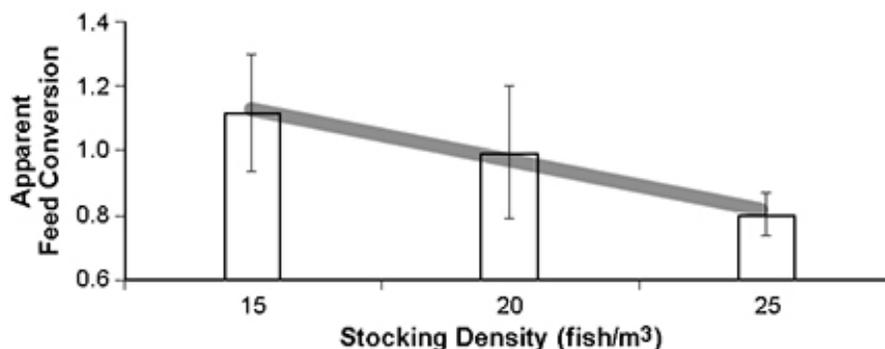


Fig. 2: Effect of fish stocking density on the apparent feed conversion of pirarucu juveniles grown in small-volume cages.

## High-protein diets

Pirarucu are carnivorous and require an expensive, extruded feed with a protein content of greater than 40 percent crude protein, which increases production costs. Despite these higher costs, it is an attractive commodity and its commercial production is attractive because of the high value that pirarucu enjoys in the Amazonian market.

## Conclusion

The pirarucu is a promising fish species for intensive cage production in the Amazon region. However, additional research in several areas is needed, including a protocol for reliable captive reproduction to supply seedstock demands and more specifically formulated aquafeeds. Also needed are better treatment protocols for diseases, and improved knowledge of stocking densities and production biomass.

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