

Aquaculture Potential of *Epinephelus akaara*

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INTRODUCTION

The development of sustainable aquaculture systems is increasingly important to meet global food demands, reduce pressure on wild fish populations and ensure the resilience of marine ecosystems. One species that has gained attention in the aquaculture industry is *Epinephelus akaara*, commonly known as the red grouper or pink grouper. This fish species is native to the Indo-Pacific region and it has shown considerable promise in aquaculture due to its fast growth, high market value and adaptability to controlled farming conditions. In this article, we explore the aquaculture potential of *Epinephelus akaara*, highlighting its biological characteristics, farming challenges and future prospects.

DESCRIPTION

Biological characteristics of *Epinephelus akaara*

Epinephelus akaara is a member of the grouper family, known for its robust body, distinctive coloration and voracious appetite. It is a carnivorous fish, typically found in coral reefs and rocky coastal areas, where it preys on smaller fish and invertebrates. As an adult, it can reach a size of up to 60 cm in length, making it a popular target for both commercial and recreational fisheries. Its preference for warm waters and stable environmental conditions makes it suitable for cultivation in tropical and subtropical regions.

The species has a relatively high growth rate, which is one of the key advantages for aquaculture. Under optimal conditions, it can grow rapidly from juvenile to market size within a year, making it a financially viable option for aquaculture farms. *Epinephelus akaara* is also known for its ability to thrive in both marine and brackish water environments, adding to its flexibility in farming systems.

Farming *Epinephelus akaara*

In aquaculture, *Epinephelus akaara* can be cultured in both open-water cages and land-based Recirculating Aquaculture Systems (RAS), which are becoming increasingly popular for their

efficiency and environmental sustainability. The fish's adaptability to various farming systems is a significant factor in its potential for widespread aquaculture.

Environmental conditions and water quality: Like many other fish species, the successful farming of *Epinephelus akaara* depends on maintaining high water quality. The species thrives in warm temperatures, typically between 24°C and 30°C and requires well-oxygenated water with stable salinity levels. Water filtration systems are essential to remove waste products, such as ammonia and uneaten feed, to maintain optimal health and growth rates.

Feeding and nutrition: As a carnivorous fish, *Epinephelus akaara* requires a protein-rich diet. In aquaculture, the fish is usually fed a combination of fishmeal, squid and other high-quality animal-based protein sources. This nutritional demand means that the sustainability of *Epinephelus akaara* aquaculture must consider the sourcing of these ingredients to avoid depleting wild fish stocks. Recent research into plant-based alternatives and more sustainable feed formulations is underway, with the goal of making grouper farming more eco-friendly.

Breeding and larval rearing: The successful breeding and larval rearing of *Epinephelus akaara* remain a key challenge in its aquaculture. While the fish is known to spawn in the wild, reproducing it in captivity requires precise environmental control. Induced breeding techniques, such as adjusting light cycles and water temperature or using hormone treatments, have been developed but still require optimization to improve hatchery success rates. Additionally, the larvae must be carefully nurtured in the early stages, as they are highly sensitive to environmental changes and vulnerable to diseases.

Economic value and market demand

The economic potential of *Epinephelus akaara* in aquaculture is significant. Grouper species are highly valued in international markets, particularly in Asia, where they are considered a delicacy and are often sold at premium prices. The flesh of *Epinephelus akaara* is firm, white and prized for its taste and texture, making it a sought-after commodity in both domestic and export markets. This high market demand creates strong

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incentives for its farming, particularly in regions with established seafood consumption cultures.

In addition to its culinary value, *Epinephelus akaara* is also of interest for eco-tourism, particularly in areas where it can be used for sustainable fisheries or as part of marine conservation efforts. The fish's potential to support both local economies and environmental restoration efforts highlights its broader value.

Challenges in *Epinephelus akaara* aquaculture

Despite its promising potential, the aquaculture of *Epinephelus akaara* faces several challenges. First, breeding and larval rearing are still not fully optimized, leading to inconsistent production and high costs for hatcheries. Additionally, disease management is a major concern, as the high density of farmed fish can increase the likelihood of outbreaks. Farmed groupers are susceptible to diseases such as Viral Nervous Necrosis (VNN) and bacterial infections, which require vigilant monitoring and management.

Another challenge is the fish's carnivorous feeding habits, which rely on fishmeal and other marine-based protein sources. The environmental impact of sourcing these ingredients has raised concerns about the sustainability of grouper farming and research into alternative, plant-based feeds is ongoing to address this issue.

CONCLUSION

The aquaculture potential of *Epinephelus akaara* is considerable, given its rapid growth, high market value and adaptability to different farming systems. While challenges related to breeding, disease management and feed sustainability remain, ongoing research and technological advancements are helping to overcome these barriers. As the demand for sustainable seafood continues to rise, *Epinephelus akaara* holds promise as a valuable species in the global aquaculture industry, contributing to both economic growth and the diversification of sustainable marine food production.