

# AQUACULTURE SPECIES SELECTION

Mark A. Peterman, James A. Steeby, and Peter J. Allen

Responsible aquaculture methods should be practiced to conserve the integrity of natural ecosystems. Following government environmental policy and regulations helps maintain ecosystem health, promotes a positive corporate image, and helps avoid costly fines and mitigation. Healthy natural ecosystems contribute to a healthy economy, which can positively impact the aquaculture market.

Some of the characteristics that would make a species ideal for aquaculture production include broad consumer appeal, availability, fast growth, reaching a marketable size before sexual maturity, efficient feed conversion, tolerance of poor water quality, and disease resistance.

Broad consumer appeal is vital for product marketing. Local and regional markets can be limiting, making distribution planning essential. Products with cultural significance and premium sensory characteristics are typically preferred. Visual appearance, smell, taste, and texture are the basic sensory characteristics and vary among species.

A candidate species must be readily available for aquaculture. Therefore, it must be legal for trade, affordable, easily domesticated, and have previously described culture methods.

Once a species becomes sexually mature, energy that could have been utilized for growth is expended on reproduction. Reproductive energy costs include physiological and behavioral demands, such as the production of gametes, attracting a mate, breeding, and care of young.

Fast growth is exhibited by most species during a specific period of their development. Identification and utilization of this period of fast growth is critical to optimizing production.

Candidate species' feeding habits in the growth phase should match the culture methods available. Plankton feeders and omnivores are generally selected for extensive and semi-intensive culture. Species requiring high protein diets usually require grading or sorting to prevent cannibalism and intensive water-quality management.

Nutritional requirements vary among species and life stage. Enhancing natural productivity through liming (i.e., addition of calcium carbonate) and fertilization (i.e., addition of organic or inorganic materials containing limiting nutrients) can meet these requirements in early life stages and lower densities. However, a commercially available diet is recommended for later life stages and higher densities.



Examining healthy fish brood stock in Bangladesh.  
*M. Gulam Hussain*

In systems with little or no water exchange, water quality declines as biomass and feeding rates increase. The culture species must be able to tolerate and perform well under these conditions. Some of the parameters that have a major impact on performance include temperature, oxygen, salinity, alkalinity, hardness, pH, ammonia, and nitrite.

Disease resistance is the ability to prevent or reduce the impact of disease. It can be attributed to a genetic or environmental factor. Most species are able to withstand a single and small stress event. However, simultaneous multiple small or single large stress events will negatively impact physiological and immune function, which can result in disease. Species that are more resistant to stress are considered disease resistant and most desirable for aquaculture.

The type of production system used for aquaculture is often species specific. A species that exhibits optimal growth and/or reproduction in an open pond environment may not perform as well in an enclosure or raceway production system. The successful culture of a particular species may require the use of multiple production systems.

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### ABOUT THE FISH INNOVATION LAB

The Fish Innovation Lab supports the United States Agency for International Development's agricultural research and capacity building work under Feed the Future, the U.S. Government's global hunger and food security initiative. Mississippi State University is the program's management entity. The University of Rhode Island, Texas State University, Washington University in St. Louis, and RTI International serve as management partners.

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