



Cage Culture

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Fish are raised commercially in one of four culture settings: **open ponds, raceways, tanks, or cages**. Cage culture of fish utilizes existing water resources but encloses the fish in a cage or basket which allows water to pass freely between the fish and the pond.

The origins of cage culture are a little vague. It is likely that the first cages were used by fishermen as holding structures until fish could be accumulated for market. The first true cages for producing fish were seemingly developed in Southeast Asia around the end of the last century. These early cages were constructed of wood or bamboo, and the fish were fed trash fish and food scraps.

Modern cage culture began in the 1950s with the advent of synthetic materials for cage construction. In the United States universities did not begin conducting research on cage rearing of fish until the 1960s. Cage research has been limited mostly because large scale open pond culture was more economically viable and, therefore, received most of the research focus.

Today cage culture is receiving more attention by both researchers and commercial producers. Factors such as increasing consumption of fish, some declining wild fish stocks, and a poor farm economy have produced a strong interest in fish production in cages. Many of America's small or limited resource farmers are looking for alternatives to traditional agricultural crops. Aquaculture appears to be a rapidly expanding industry and one that may offer opportunities even on a small scale. Cage culture also offers the farmer a chance to utilize existing water resources which in most cases have only limited use for other purposes.

It should be emphasized that cage culture of fish is not foolproof or simple. To the contrary, cage production can be more intensive in many ways than pond culture and should probably be considered as a commercial alternative **only where open pond culture is not practical**.

Considerations for cage culture

As with any production scheme cage culture of fish has advantages and disadvantages that should be considered carefully before cage production becomes the chosen method.

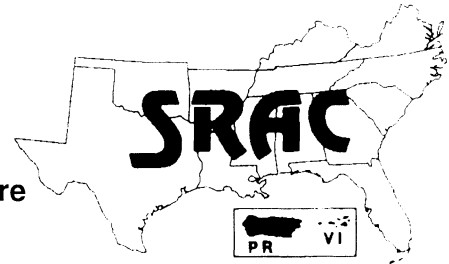
Advantages

Cage culture does have some distinct advantages which include:

- Many types of water resources can be used, including lakes, reservoirs, ponds, strip pits, streams and rivers which could otherwise not be harvested. (Specific state laws may restrict the use of "public waters" for fish

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- production; check with your state fish and wildlife agency.)
- A relatively low initial investment is all that is required in an existing body of water.
- Harvesting is simplified.
- Observation and sampling of fish is simplified.
- Allows the use of the pond for sport fishing or the culture of other species.

These advantages are appealing. A potential fish farmer can produce fish in an existing pond without destroying its sportfishing; does not have to invest large amounts of capital for construction or equipment; and can, therefore, try fish culture without unreasonable risks.

Disadvantages

Cage culture also has some distinct disadvantages. These include:

- Feed must be nutritionally complete and kept fresh.
- Low Dissolved Oxygen Syndrome (LODOS) is an everpresent problem and may require mechanical aeration.
- The incidence of disease can be high and diseases may spread rapidly.
- Vandalism or poaching is a potential problem.

The potential for loss of fish due to poor nutrition, LODOS, disease and poaching is real and should not be taken lightly. Feeds must be **complete** and provide all the necessary proteins, carbohydrates, fats, vitamins and minerals needed for growth and health. Feeds cannot be allowed to deteriorate during storage. Low Dissolved Oxygen Syndrome may occur within a cage and not affect the fish free in the pond. Because fish in cages are crowded and confined, aeration may be more necessary for a cage system than it would be if the fish were loose in the pond. Diseases must be identified and treated rapidly. Vandalism is a problem which has to be anticipated and precautions must be taken. It should be emphasized that

cages do not increase the amount of fish (i.e., pounds) that can be produced in a pond. This is particularly true in ponds with wild fish populations.

Species selection

Research in the United States on production of freshwater fish in cages has centered primarily on channel catfish and rainbow trout. Other species such as tilapia, hybrid sunfish, red drum, hybrid striped bass, bullhead catfish and blue catfish have received some attention and may have potential for cage production. Before attempting to raise any species in cages a careful examination of the site, water quality, construction costs, market outlets and legal requirements should be considered.

This is the beginning of a series of Cage Culture publications which will attempt to answer questions on how to build and where to locate cages, which species to select, how to evaluate water quality, how to handle and feed caged fish, how to recognize problems, and how to evaluate cage success and economics. Please refer to the following Cage Culture publications for additional information:

SRAC Publication No. 161, Cage Culture—Site Selection and Water Quality

SRAC Publication No. 162, Cage Culture—Cage Construction and Placement

SRAC Publication No. 163, Cage Culture—Species Suitable for Cage Culture

SRAC Publication No. 164, Cage Culture—Handling and Feeding Caged Fish

SRAC Publication No. 165, Cage Culture—Cage Culture Problems

SRAC Publication No. 166, Cage Culture—Harvesting and Economics.

References

- Basset, B.K. and J.G. Dillard. 1985. *Raising Catfish in Floating Cages*. Cooperative Extension Service, University of Missouri-Lincoln University. 26 pp.
- Beem, M., and G. Gebhart, *Cage Culture of Rainbow Trout*. Langston University. Langston, OK. 4 pp.
- Beveridge, M.C.M. 1987. *Cage Aquaculture*. Fishing News Books LTD. Farnham, Surrey, England. 352 pp.
- Boyd, C.E. 1979. *Water Quality in Warm Water Fish Ponds*. Alabama Agricultural Experiment Station, Auburn University, Auburn, AL. 359 pp.
- Collins C.M. 1974. *Catfish Cage Culture-Fingerlings to Food Fish*. The Kerr Foundation, Inc., Publication No. 13. Poteau, OK. 22 pp.
- Helfrich, L.A., J.C. Dean, D.L. Garling, and D.L. Weigmann. 1984. *Catfish Farming in Cages in Virginia's Warmwater Ponds and Lakes*. Virginia Cooperative Extension Service, Virginia Tech and Virginia State, Virginia's Land-Grant Universities. 13 pp.
- Schwedler, T.E., M.L. Berry, and D.R. King, 1986. *Raising Catfish in a Cage*. Clemson University Cooperative Extension Service, Clemson University, Clemson, SC. 23 pp.
- Stickney, R.R. 1979. *Principles of Warm Water Aquaculture*. Wiley Interscience, New York. 375 pp.
- Strange, D. and S. Van Gorder. 1980. *Small-scale Culture of Fish in Cages*. Rodale Press, Kutztown, PA. 34 pp.
- Williams, K., D.P. Schwartz, and G.E. Gebhart. 1983. *Small-Scale Caged Fish Culture in Oklahoma Farm Ponds*. Cooperative State Research Service, Langston University, Langston, OK. 25 pp.

For more information about aquaculture in Oklahoma, see our OSU county Extension agent or contact Marley D. Beem, Area Extension Aquaculture Specialist, Box 1378, 1630 E. Beverly, Ada, OK 74820 (phone: 405-332-4100).

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