

# Georgia Center for Aquaculture Development (GCAD) at Fort Valley State University

The Georgia Center for Aquaculture Development was established through the Georgia Legislature in 2004 to provide educational and training opportunities for the citizens of Georgia, and to conduct research, demonstrations, technology transfer and outreach to promote and develop aquaculture in the state of Georgia.

The facilities of GCAD were planned to increase the capacity of FVSU to carry out the mission of the Center. To move aquaculture development forward in the state, it was recognized that facilities were needed to conduct research and facilitate the education and training of a workforce to support the further increase and development of commercial aquaculture enterprises.

Collaborative efforts with UGA Aquaculture Specialists have been set in place since the beginning of this program effort. The GCAD was created to provide science-based solutions for problems that have hindered the development of the aquaculture industry including those dealing with disease, nutrition and inadequate growth, reproductive problems, and water quality issues, among others. It is also important to support the development of emerging aquaculture species, such as marine species with high market value, with research on hatchery, nursery, and growout production.

Program goals of the Georgia Center for Aquaculture Development include:

- Establish an applied and basic research program which addresses problems that threaten the economic viability of the aquaculture industry.
- Promote further development of commercial aquaculture as an agricultural enterprise that is economically viable and ecologically sustainable.
- Provide support in aquaculture system development and implementation of aquaculture technology transfer to underrepresented minorities in rural and urban communities and to small and limited resource farmers and families.
- Conduct research to develop innovative aquaculture production technologies with new or existing species that will help to improve profitability, increase competitiveness in the global market, and reduce imported seafood deficits.
- The aquaculture program encompasses a variety of production systems and species. Georgia residents can observe and learn about various types of aquaculture production systems and services needed. The core programs are listed here below.

**Cage Culture-** Initially, most aquaculture was carried out in ponds as in the catfish industry today. To enter commercial scale catfish production today requires that you would usually have at least 20 acres of land and the capital resources to construct ponds and buy equipment. In many cases, this prevents the small, limited resource farmer from becoming involved in this type of aquaculture. Small-scale cage aquaculture can be carried out in one-acre ponds of the appropriate depths or in large un-drainable barrage ponds. With the utilization of aeration and airlifts it is possible to raise many more fish than without this additional circulation of the water.

**Greenhouse Aquaculture Production and Aquaponics-** Aquaculture production in closed recirculating systems in greenhouses allows farmers to better control their environment and raise multiple crops throughout the year. A variety of species can be reared in greenhouses including both fish and shellfish. Greenhouse designs will incorporate solar energy and integrated hydroponics with fish or shellfish production to provide for the greatest overall production from the systems. Recirculating systems will be used for fish and shellfish where the sludge or waste will be collected and passed on to plants in the hydroponic units. Plants such as herbs, lettuce, oriental vegetables and other plants can be grown on fish waste and add profit to the overall production system. By combining hydroponics with aquaculture, a more sustainable aquaculture system is created called aquaponics, where another product is grown on the waste produced by the fish. Greenhouse production provides year round production of fish and vegetables or herbs which will supply markets continuously and provide a viable industry.

**Inland Farming of Marine and Freshwater Shrimp and Prawns-** Inland farming of marine shrimp in low salinity waters or fresh water with added minerals is another area of research and development. Research will be conducted to make it more profitable by reducing energy costs, incorporating solar energy, improving feeds, stocking densities, and system design. Other inland marine shrimp research will concentrate on the use of different probiotics, immunostimulants, and different phytoplankton.

**Commercial Pond Production-** Commercial pond production is still a viable aquaculture enterprise with various fish and shellfish species, however research is needed to make it more profitable. In Georgia, different stocking and marketing strategies will be used to develop profitable commercial pond operations. Polyculture or different species in combination with channel catfish, such as bream or other sunfish species, or growing more valuable hybrid striped bass or red drum will allow farmers to make larger profits than traditional catfish farming. Paddlefish and lake sturgeon are two other species of high market value which should be evaluated due to their potential as culture species.

**Marine Fish Culture-** As the ocean catch is further reduced the demand for ocean fish must be met by aquaculture. Many marine fish have been found to have a tolerance for lower salinities than originally thought, which makes it easier to grow them in recirculating systems and ponds further inland from the ocean. Many of these fish have a high market value and offer a high profit margin. Culture techniques for striped bass, red drum, flounder, and others have been worked out and it is now possible to raise them in recirculating systems or ponds.

**Urban Aquaculture-** With the advent of and the technological advances in recirculating systems, it is possible to raise fish in many areas distant from normal settings normally associated with fish culture or agriculture. Rising land prices, water quality problems, scarce water and stringent waste disposal laws are making it more difficult to raise fish and shellfish in farm ponds and natural bodies of water. Recirculating systems can be operated indoors on well water or city tap water which is filtered and recirculated and can be operated in a variety of settings. Recirculating systems in urban settings have proven to be good teaching tools in agriscience programs. Recirculating systems can also be used by community groups such as shelters, food banks, or volunteer groups to provide badly needed protein in an urban setting.

**Aquatic Animal Health Management-** Treating diseases can be costly, treatments don't always work and the loss of animals and production is always expensive. The best strategy is developing aquatic animal health management plans and using treatments to enhance health and disease

resistance. Water quality has a critical impact on the health of the aquatic animal in the aquaculture production system. In ponds there are sometimes algae or aquatic weed problems which occur. GCAD will provide diagnostic services for water samples and aquatic weed identification. Education and training on the best management practices to avoid disease in aquatic animals are necessary for producers to achieve optimum production and profit. Workshops, publications, presentations at meetings and trainings aimed at the development of aquatic animal health management plans are all important to help prevent disease. When disease outbreaks occur, support is necessary through disease diagnosis, water analysis and treatment recommendations through maintenance of an aquatic diagnostic laboratory.

**Ornamental and Tropical Fish-** The tropical ornamental fish market is worth over \$70 million and continues to increase each year. The tropical fish hobby also continues to grow with the majority of organisms being caught from the wild. Great opportunities are available for the culture of both fresh and saltwater fish and invertebrates for the ornamental fish trade.

**Biofuel Production-** One of the problems associated with many of the biofuel sources being currently produced is that using crops as biofuels which have historically been used as food or livestock feeds have made a financial crisis by causing huge increases in food prices. By utilizing biofuel systems that produce algae, a non-food source, there is a much better use of resources where waste products are sustainably used to produce fuel. In the production of algae in biofuel systems in greenhouses, the excess production of carbon dioxide by the aquaculture animals is incorporated into a system to produce algae for biofuel. Different algal species will be utilized to determine the species best suited for fuel production and biomass in our area of Georgia.

**Aquaculture Education and Extension-** Aquaculture extension activities and training are carried out in a variety of ways. We currently hold aquaculture workshops on a variety of topics throughout the year and speak at Team Agriculture Georgia (TAG, Farm Bureau, and other organizational meetings to present aquaculture information to citizens throughout the state. In depth aquaculture training workshops are held on campus as aquaculture facilities become available for “hands on” experience. Tours of existing aquaculture greenhouse facilities are given throughout the year which exposes teachers, young people and the public to our aquaculture facilities in and up close and personal experience.

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