



Spotlight on Innovation

Recirculating aquaculture technology is warding off future seafood shortages

One sees it at local groceries and fresh markets. It's evident on the price list for fresh fish at many restaurants.

Seafood prices are on the rise, spurred by growing demand, a rapidly rising world population, and increasing pressures on already-depleted fish populations.

Virginia Tech researchers and **Virginia Cooperative Extension** specialists are helping meet that growing demand with recirculating aquaculture technology.

In short, they're growing fish at land-lubbing locales.

By moving seafood production away from oceans and estuaries and into a controlled setting, recirculating aquaculture makes it possible to ward off future seafood shortages, safeguard the environment, and provide a spark for new enterprise.



Growing fish

Recirculating aquaculture refers to a method of growing fish at high densities under controlled conditions in indoor tanks. This approach to fish production minimizes the amount of water and land needed, and greatly expands the opportunities to grow fish in geographic areas that are normally

unsuitable locations for seafood harvesting.

Virginia Tech's **College of Agriculture and Life Sciences**, **College of Engineering**, **College of Natural Resources**, and **Virginia-Maryland Regional College of Veterinary Medicine** are conducting research, developing new technologies, and offering educational programs. Various Extension programs also are providing industry support.

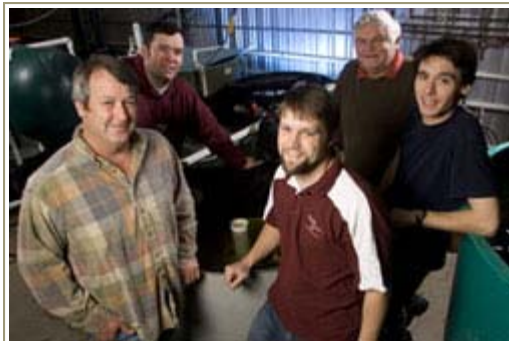
Progress in this field is essential. According to The Food and Agriculture Organization of the United Nations, the current pace of seafood consumption — 7 kilograms (15.4 pounds) per capita for the United States and 16 kilograms (35.2 pounds) worldwide — is not sustainable, and it necessitates the development of alternative ways to bring fish and shellfish into the market.

Virginia Tech is unique in the depth and breadth of recirculating aquaculture research and Extension it supplies.

Facilities in detail

Blacksburg, Va.

One of the largest facilities dedicated to recirculating aquaculture research is the **Virginia Tech Aquaculture Center (VTAC)** in Blacksburg, Va. VTAC supports graduate-level research on a variety of fish species, including tilapia and cobia.



VTAC facilities can accommodate research in fresh, brackish, and marine waters under temperate, warm, and tropical conditions. Current research on cobia includes finding alternative protein and lipid sources for the fast-growing fish, as well as research on immunology and development.

The **Aquatic Medicine Laboratory** at the Virginia-Maryland Regional College of Veterinary Medicine (VMRCVM) in Blacksburg is a fully functional fee-for-service laboratory. It provides diagnostic services to aquaculturists, home aquarists, and researchers.

The laboratory specializes in the detection and evaluation of diseases affecting marine and freshwater foodfish species. It also

(Left to right) Professor Steven Craig, aquaculture technician Robert Woods, graduate student David Kuhn, Professor Ewen McLean, and graduate student Guillaume Salze are working on a number of different research projects at VTAC.

works to identify parameters for the evaluation of fish health, including comparative blood chemistry and immunologic profiles for healthy and ailing fish.

Hampton, Va.

Located on the Hampton, Va., waterfront, the **Virginia Seafood Agricultural Research and Extension Center (VSAREC)** specializes in larval rearing of marine species, such as summer flounder and cobia.

VSAREC faculty members consistently achieve some of the highest survival rates documented during this fragile stage of the life cycle. The VSAREC not only provides fish for its own ongoing aquaculture research projects, but also supplies juvenile fish to the VTAC facility.

Additionally, the VSAREC hosts residential training programs for industry hatchery managers and graduate students, and conducts annual intensive marine larviculture production workshops.

Saltville, Va.

Situated in Virginia's mountainous west, the **Southwest Virginia Aquaculture Research and Extension Center** offers prospective growers concrete aquaculture production information.

This facility functions as a working freshwater recirculating aquaculture venture raising yellow perch. The center reaches out to area tobacco and dairy farmers and landowners interested in finding an alternative income-generating crop. They also offer hands-on learning opportunities and ongoing Extension support for new aquaculture businesses in the region.

The laboratory also investigates the potential usefulness of new drugs for use with cultured fish, develops vaccines for disease prevention, and explores the crossover potential of diseases such as mycobacteriosis, which can harm fish population and infect humans who encounter contaminated waters.

Industry impact

Laboratory facilities, research programs, short courses, and diagnostic centers are geared to make a difference for the industry while adding to the knowledge base on animal physiology, management principles, and sustainable agriculture.

One way this knowledge is being put to work is at Blue Ridge Aquaculture facility in Martinsville, Va. The newest venture for Blue Ridge Aquaculture is a project to use tilapia effluents to support shrimp aquaculture.

Virginia Sea Grant and the U.S. Department of Agriculture will support the research at the shrimp culture facility that a multidisciplinary team of Virginia Tech researchers will conduct. They ultimately hope to establish the feasibility of shrimp/tilapia co-culture on a commercial scale.

Through the support of these facilities, Virginia Tech researchers throughout Virginia will continue to make inroads into the science and application of recirculating aquaculture and to lead the way in disseminating this information to aquaculturists around the world.

- ▶ For more information on aquaculture at Virginia Tech, read the **Fall 2006 issue of Virginia Marine Resource Bulletin**, which is a publication of Virginia Sea Grant and the College of William and Mary.



Fish nutrition specialist Steven Craig (VMRCVM) and fish physiologist Ewen McLean (right) administer a specially formulated feed to juvenile cobia at VTAC.



[View our Virginia Tech Aquaculture Center photo gallery.](#)



[View our Blue Ridge Aquaculture photo gallery.](#)

Industry information

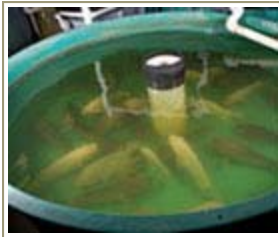
Podcasts:

- ▶ [Positive economic impacts and the industry's future](#)
(Length 19:30)
- ▶ [Aquaculture research, marine ornamentals, and support](#)
(Length 12:03)
- ▶ [The Saltville facility and its relationship with Blue Ridge Aquaculture](#)
(Length 10:57)

Tilapia at VTAC



Aquaculture Center lab manager Robert Woods peers into the mouth of a large tilapia kept for breeding purposes.



Tilapia are mouth-brooders. Adult fish exhibit a tendency to protect just-hatched larvae by holding them inside their mouths.

Related news

- ▶ *January 2007*
[Virginia Tech Expands Aquaculture Research Efforts](#)
- ▶ *10.18.2006*
[Gov. Kaine Announces 60 New Jobs in Town of Saltville](#)
- ▶ *10.04.2006*
[Partnership to break ground on shrimp aquaculture](#)

Technological advances

Video clips from the Virginia Cobia Farms press conference in Saltville, Va.



- ▶ [Bill Harris, of Virginia Cobia Farms, on cobia technology and Virginia Tech contributions.](#)
(Quicktime; runs 9:15)



- ▶ [Virginia Cobia Farms' Bill Martin discusses the relationship between Saltville and aquaculture.](#)
(Quicktime; runs 3:49)

Learn more ...

- ▶ [A new niche for fluke](#) (PDF)
- ▶ [6th International Conference on Recirculating Aquaculture brings researchers and practitioners together](#) (PDF)
- ▶ [Larviculture workshops offer intensive instruction](#) (PDF)
- ▶ ['Aqua-Genomics' VTAC's new thrust](#) (PDF)
- ▶ [Gov. Kaine announces Virginia Cobia Farms investment in Saltville, Va.](#) (PDF)

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