

ARS National Research Program for Aquaculture

Fish and shellfish farmers are facing formidable challenges. To meet today's growing demand for seafood in a sustainable way, U.S. aquaculture producers, especially small and mid-sized ones, need new ways to cut their production costs while improving product quality and reducing environmental impacts.

ARS's strong national research program in Aquaculture (#106) is bringing resources to bear to coordinate genomics, genetics, nutrition, health, and physiology in research projects to enhance the farming of fish and other aquatic species. National program #106 also cooperates with ARS research programs in the natural resources and sustainable agriculture areas as well as with Food Safety (national program #108) and Quality and Utilization of Agricultural Products (national program #306).

One of the priorities of the ARS aquaculture program is to develop genomics libraries and bioinformatic tools for current and emerging farmed aquatic species and incorporate that information into breeding research to enhance available germplasm. Data from breeding, nutrition, and health studies feeds back into genomics work and provides direct results to enhance production.

ARS breeding programs, several of which are run in conjunction with university counterparts, are developing fast-growing fish and shellfish with enhanced disease resistance, improved fillet yield, and better reproduction. These breeding programs are based on traditional selective breeding practices,



though they are moving quickly to incorporate information from genomics research into the selective breeding programs.

As ARS expands the genomics information available for farmed aquatic species, breeding research is able to incorporate genomic information and improve the selection process. ARS has already identified individual genes for growth, metabolism, muscle development, and fish health.

Genomic data is now enabling researchers to develop multitrait selection projects, using tools such as genetic markers for important

genomic locations. Development of other tools, such as new methods for cryopreserving aquatic germplasm, is helping to enhance research and provide an important backup for aquatic species. Long-term cryopreservation storage of gametes for other aquacultured species, such as striped bass, tilapia, shrimp, and oyster, is being developed.

ARS scientists are also working on methods to genetically identify and reproductively isolate domesticated stocks to prevent unintended interactions between farmed and wild populations. *

Worth a Look: The National Agricultural Library's Aquaculture Web Pages

Whether you're interested in the business of farming fish, the science of aquaculture, or simply want to create a fish pond for your home garden, you'll want to browse the aquaculture web pages developed and hosted by the Agricultural Research Service's National Agricultural Library in Beltsville, Maryland, and Washington, D.C. (tinyurl.com/NALaqua).

Part of the library's Alternative Farming Systems Information Center, this fish-focused venue offers links to more than 160 carefully selected websites. Browse the home page for specially featured sources that open the door to information on everything from farming catfish, carp, salmon, shrimp, and many more species to business planning for a fish-farming operation.

Some of these featured links connect you to National Sea Grant sources on environmentally friendly fish farming and to time-saving searches on many aspects of aquaculture (tinyurl.com/aquasearch). These comprehensive searches include the National Agricultural

Library's own AGRICOLA (AGRICultural On-Line Access) database, which encompasses the library's substantial collection. Holdings include articles from major scientific and industry journals and more than 4,000 books—old and new—on an impressive array of aquaculture subjects.

The collection's oldest aquaculture volume might well be a 1786 compendium from Britain that advises "country gentlemen" on the basics of establishing and maintaining rural fish ponds "for pleasure and profit." Newer acquisitions include the Mississippi-based Southern Regional Aquaculture Center's 2010 book on fish genetics.

Other links take you to, for example, research organizations, federal agencies, databases of laws and regulations, and sources of graphics and images suitable for use by students and professionals alike.

Says program support assistant and aquaculture site content contributor Rebecca Thompson, "Anyone interested in aquaculture is likely to find something new and interesting on our web pages."—By **Marcia Wood, ARS.** *