



## ADVANCING SUSTAINABLE AQUACULTURE PRODUCTION

The ARS aquaculture research program delivers new knowledge and technologies that improve domestic aquaculture production efficiency and product quality while minimizing impacts on natural resources. This work advances the efforts of more than 2,900 aquaculture farmers who produce more than \$1.5 billion worth of goods annually to meet the market demand generated by 300 million U.S. consumers. The following accomplishments highlight ARS FY 2020 advances in catfish, trout, pompano, and salmon production.

**Delta Select strain of channel catfish released to industry.** ARS researchers in Stoneville, Mississippi, developed the 'Delta Select' strain of channel catfish, which has a 25 percent increase in growth rate and 0.9 percent increase in carcass yield compared to the control line originating from the same population. ARS released approximately 90,000 head (180,000 pounds) of 2-year-old Delta Select catfish to industry, providing U.S. farmers access to improved catfish germplasm that will reduce production costs and make farmers more efficient, profitable, and competitive in the global seafood market.



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**A bacteriophage for preventing disease in rainbow trout.** Bacteriophages (phages) are viruses that infect and kill bacteria. Used against disease-causing microbes, phages are excellent candidates for preventing or treating of bacterial diseases. ARS researchers in Leetown, West Virginia, identified a new phage that kills *Yersinia ruckeri*, the rainbow trout pathogen. In addition to directly infecting and killing *Yersinia ruckeri*, the phage increases the bacteria's susceptibility to the trout immune system, preventing its survival inside its fish host.

**A draft genome sequence for Florida pompano.** The lack of available genome information is a hurdle in implementing state-of-the-art selective breeding strategies for many aquaculture species, including Florida pompano. ARS-funded researchers in Fort Pierce, Florida, established a complete draft genome of the Florida pompano by using a hybrid sequencing method and novel bioinformatics workflow. This draft genome will improve farm production and profitability and enhance breeding strategies by identifying genes associated with aquaculture production efficiency and product quality.

**Genome-enabled breeding tools for Atlantic salmon.** The number of U.S. commercial Atlantic salmon farming operations is expected to increase 5-fold over the next 3 years, and demand for genetically improved stocks will increase dramatically. ARS researchers in Franklin, Maine, and Leetown, West Virginia, created an improved genome reference sequence for the North American Atlantic salmon and developed the first DNA chip for Atlantic salmon, thereby enabling the use of genomic information in breeding strategies. This DNA chip is publicly available and in use by commercial breeding programs.