

Aqua

U.S. Department of Agriculture Accomplishments Report AD-421 U.S. Dept. of Agriculture, State Agricultural Experiment Stations and Other Institutions			Date (Month, Day, Year) 03/22/2012
1. Accession 0216998	Agency Identification No. 2. CSREES 3. LA.B	5. Work Unit/Project No. LAB93954	6. Status Annual Report
7. Title Preservation and Improvement of Genetic Resources of Fish and Shellfish			
12. Investigator Name(s) (Last Name and Initials) Yang, H.			
20. Termination Date 09/30/2013		40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011	
Outputs: Research on sperm cryopreservation of fish and shellfish and results of experiments conducted during 2011 were disseminated through publication in scientific journals and book chapters, and through presentations at academic meetings such as the World Aquaculture Society, American Fisheries Society, and the Gulf Region Conservation Symposium. In addition, the results were reported through annual progress reports to the related funding agencies.			
Outcomes/Impacts: Protocols for sperm cryopreservation of eastern oyster were established by using high-throughput processing automated equipment for sample filling and sealing. Two types of 0.5-ml straws (French straws and CBS straws) were evaluated in this research to meet the processing requirements. With optimized protocols, cryopreserved sperm yielded fertilization percentages of 58% (plus or minus 24%) for French straws, and 54% (plus or minus 21%) for CBS straws (n = 16). The data for this research has been drafted into one manuscript, and it is currently in review by Aquaculture. Protocols developed for cryopreservation of sperm from diploid eastern oysters were applied to cryopreservation of sperm from tetraploid oysters. Preliminary data were collected, and this research will be continued as long as tetraploid oysters are available. In addition, a non-lethal method for sperm collection from eastern oyster was developed. By integrating the protocols for sperm cryopreservation with non-lethal sperm collection, cryopreserved sperm from one-year-old males have been used for fertilizing eggs from the same oyster after sex-reversal (self-fertilization). Inbreeding depression was observed for fertilization and larval survival. Analysis of the data from this research is in progress. A series of experiments was performed with <i>Fundulus grandis</i> for evaluating sperm motility and developing protocols for sperm cryopreservation and in-vitro fertilization. Data analysis is in progress. For biomedical fishes (zebrafish, medaka and <i>Xiphophorus</i>), protocols previously established were refined by using flow cytometry to analyze effects on sperm quality of osmotic pressure, storage time, and concentration of cryoprotectants. Also, the feasibility of establishing sperm repositories for medaka and <i>Xiphophorus</i> fishes was studied. About 20 genetically modified strains, or lines, of medaka were processed by following the strategies proposed; and sperm viability was evaluated by computer assisted sperm analysis, flow cytometry, and fertilization. This research is in progress.			
Publications: Yang H, Tiersch TR (2011) Application of Computer-assisted Sperm Analysis (CASA) to Aquatic Species. In: Tiersch TR, Green C, editors. Cryopreservation in Aquatic Species. II ed. Baton Rouge, LA: World Aquaculture Society. Yang H, Tiersch TR (2011) Sperm Cryopreservation in Biomedical Research Fish Models. In: Tiersch TR, Green C, editors. Cryopreservation in Aquatic Species. II ed. Baton Rouge, LA: World Aquaculture Society. Yang H, Hu E, Tiersch TR (2011) High-throughput Sperm Cryopreservation for Eastern Oysters. The 32nd Annual Meeting of the American Fisheries Society Louisiana Chapter January 27-28. Tiersch TR, Yang H, Hu E (2011) Outlook for development of high-throughput cryopreservation for small-bodied biomedical model fishes. <i>Comp Biochem Physiol C Toxicol Pharmacol</i> 154: 76-81. Hu E, Yang H, Tiersch TR (2011) High-throughput cryopreservation of spermatozoa of blue catfish (<i>Ictalurus furcatus</i>): Establishment of an approach for commercial-scale processing. <i>Cryobiology</i> 1: 74-82.			

Cuevas-Uribe R, Yang H, Daly J, Savage MG, Walter RB, et al. (2011) Production of F1 Offspring with Vitrified Sperm from a Live-Bearing Fish, the Green Swordtail Xiphophorus hellerii. Zebrafish 8: 167-179.

Participants:

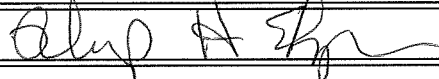
H. Yang (PI), T.R. Tiersch, LSU AgCenter; along with numerous collaborators.

Target Audiences:

Target audiences are members of the scientific community; agencies involved with biodiversity and endangered-species conservation; and producers of oysters and ornamental fishes.

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date
		3-23-12