

TCRF Report Respirometer

PIs: Petersen, L; Hala, D.

Research equipment procured using TCRF funds: The requested, and awarded, TCRF funds were used to support new interdisciplinary research projects in fish conservation physiology and toxicology among the Petersen, Hala, Marshall, and Schulze laboratories at Texas A&M University at Galveston (TAMUG).

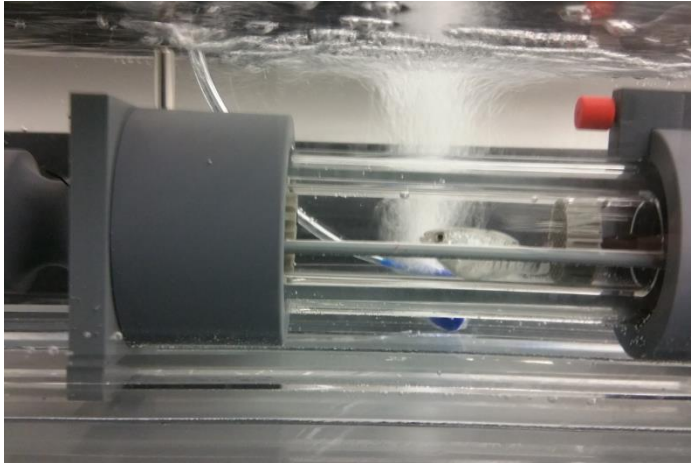


Figure 1: 0.17 Liter respirometer with fish inside

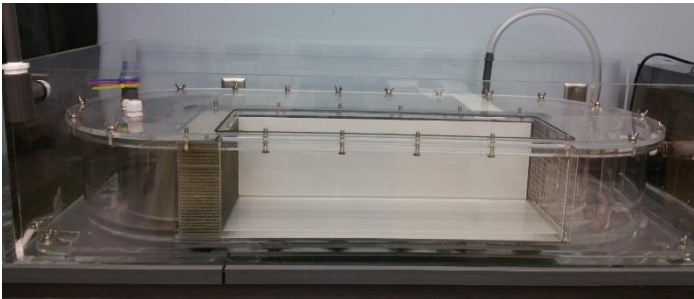


Figure 2: 90 Liter Respirometer

The TCRF funds were used to purchase two swim tunnel respirometers, 0.17 Liter (Figure 1) and 90 Liter (Figure 2), for use with adult life-stages of fish, and two micro-respirometers, 0.1 mL and 1 mL (not pictured), for use with embryo/larval or juvenile life-stages of fish. These respirometers allow the precise measurement of fish swim performance and respiration rate (or oxygen consumption). As a result, these instruments allow us to study how environmental stressors, whether natural or man-made, can impact the ability of fish to swim (i.e. search for food, evade predators) or be healthy (i.e. oxygen consumption rate can be used to represent metabolic health).

The use of equipment to support research: The respirometry instruments purchased have already supported four active research projects over the past three years, and directly involved six undergraduate and two graduate students in

research activities. The instrumentation has also supported a visiting post-doctoral scientist from University of Texas Austin, to test oxygen consumption in local marine invertebrates.

The respirometry instruments are currently being used to support two undergraduate research scholar students, participating in TAMU's LAUNCH program, in the Petersen and Hala labs. One student studies the ability of fish to adapt to metabolic stress, caused by disrupting the activity of an important metabolic enzyme, and the other will investigate the effects of a sunscreen ingredient that is a common pollutant in coastal ecosystems, on fish metabolic health and growth.

In addition, the respirometry instruments will also be used for a recently funded Texas Parks and Wildlife Department (TPWD) project, awarded to Drs. Hala and Petersen, which will study the endocrinology of southern flounder. Given the continuing declines in southern flounder populations in the northwestern Gulf of Mexico, the TCRF funded respirometers will be used to determine how respiration rates influence larval southern flounder health, growth and survival. A Ph.D. student has already been recruited to work on this project.

Advancement of Science in the State of Texas: The research already supported by the TCRF funds have led to two manuscripts in-preparation, one funded grant (TPWD), and another grant in-preparation for submission to the Morris Animal Foundation (MAF). The proposal to MAF will study the effects of a human pharmaceutical detected at relatively high levels in Galveston Bay. Collectedly, the TCRF funds awarded have greatly advanced the capacity of TAMUG to conduct state-of-the-art research in fish physiology and toxicology. The applications of these tools to study threatened species (such as the southern flounder) and the effects of environmental pollution on fish, contribute to furthering the ocean-orientated research impact of TAMUG, while addressing the priority conservation issues for the State of Texas.