Mitigation of Hypoxic Ecosystems Using Hemolymph Analysis of Callinectes sapidus and Procambarus clarkii in Relation to Spartina Grasses, Year Two

Bush, Natalie

In the past 80 years, Louisiana has lost over one-million acres in land, affecting plants and crustaceans that live in these environments. The first objective of this research was to determine the relationship between diffused oxygen in water and time with the behavioral and physiological health of Callinectes sapidus (blue crab) and Procambarus clarkii (crawfish). Nine crabs were under hypoxic conditions in 15-gallon pots, while nine crabs were aerated. After 24 hours, manual dexterity, or the amount of time it takes for a crustacean to flip itself over, was measured with a timer. Hemolymph was extracted using a syringe and tested for lactate, glucose, and protein. Fourteen replications of crawfish were exposed to this same procedure. Additional crawfish tests with Spartina grasses as the aeration methods were conducted. Duncan's Multiple Range tests were conducted to measure the data's variance at the 0.05 level. The hypoxic groups for all three studies had a significantly greater manual dexterity time and greater amounts of lactate and glucose. The protein was significantly higher in hypoxia-exposed crawfish. Time and aeration affect the health of crustaceans, and plants can effectively replace synthetic aeration. The second objective was to provide a full plan for the necessary vegetation, planting details, and funds for the stabilization of Trinity Island, of Isle Dernieres. Using graph theory, a model was created using Pick's Theorem (A=I+B/2-1) to calculate that 1,046,787 mangroves; 4,187,147 Spartina alterniflora; and 4,187,147 Spartina patens with a total soil substrate of 24,010 m³ are needed to stabilize Trinity Island.

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