Species Diversification of Farfantepenaeus duorarum in South Florida Aquatic Ecosystems: The Significance of Genetic Variation within Geographically Diverse Pink Shrimp Populations

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F. duorarum is one of the most economically important shrimp species in the US, and also may serve as a critical indicator for assessing effectiveness of Everglades restoration. Understanding its genetic diversity has become a major concern in the management and conservation of F. duorarum, as limited knowledge of phylogenetic relationships within groups of exploited species can lead to both erosion of genetic structure and extinction of local populations. This study evaluates whether there is speciation between select populations of pink shrimp in various water bodies of S. Florida, measured both molecularly and morphologically. Molecular assessment allowed for closer, more precise analysis of the shrimps' genome. F. duorarum was sampled from 3 costal locales: Bradley Key, Whitewater Bay (Both in Everglades NP), and S. Virginia Key. DNA extractions from specimens and PCR of 3 different genes of interest were performed; 16S, 12S, and CO1. Using next-generation sequencing techniques, genetic variation between each sequence was determined. Results show unexpected genetic variation (p-distance>0.015); the most significant variation was identified from specimens in S. Virginia Key. These novel findings are exciting, with significant ecological and economic implications. Genetic divergence and speciation can have long term impact on population dynamics of shrimp beds, and could significantly affect the industry's future. Additionally, this study reveals that F. duorarum can serve as an important indicator of the overall wetland health, due to genetic stability and key ecological relationships between these animals and the ecosystem. Variation in population numbers and species diversity of F. duorarum can serve to show if our enormously costly restoration efforts are working.