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Differential susceptibility to the Withering Syndrome agent and renal coccidia in juvenile *Haliotis rufescens*, *Haliotis discus hannai* and the interspecific hybrid



Roxana González^{a,*}, Karin B. Lohrmann^b, Javiera Pizarro^b, Katherina Brokordt^a

^aCentro de Estudios Avanzados en Zonas Áridas (CEAZA), Universidad Católica del Norte, Larrondo 1281, Coquimbo, Chile

^bFacultad de Ciencias del Mar, Universidad Católica del Norte, Larrondo 1281, Coquimbo, Chile

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ABSTRACT

Withering Syndrome (WS) is a pathogenic chronic disease caused by the intracellular rickettsial-like bacterium “*Candidatus Xenohaliotis californiensis*” (WS-RLOs), which affects many abalone species. The renal coccidium (*Margolisiella haliotis*) has often been observed concurrent with WS infection. The red abalone *Haliotis rufescens* is a very susceptible species to WS and is also infected by the coccidium *M. haliotis*. In contrast, the Japanese abalone *Haliotis discus hannai* is not infected by these parasites. Interspecific hybridization is a method for improving important traits in animal husbandry. The objective of this study was to determine susceptibility to WS-RLO and *M. haliotis* infection in the hybrid generated from a cross between red and Japanese abalones. Juveniles from both species and the interspecific hybrid were challenged by exposure to effluent from red abalone adults infected with both parasites. The animals were analyzed by histology at 130 days post-challenge. A 33% prevalence WS-RLOs was observed in the red abalone *H. rufescens*, whereas a 20% prevalence was observed in the hybrid. Infections were graded on a scale of 0–3. Of these red abalones infected, 53% presented grade 1 infection intensity, 10% had grade 2 infections, and 50% had grade 3 infections. However, the hybrids only presented intensities at the extremes of the scale; of those infected 33% showed grade 1 infections and 66% had grade 3 infections. The coccidium prevalence was 7% in red abalone individuals and 13% in the hybrid abalone. In contrast, the Japanese abalone did not present infections with either parasite. As with the prevalence, the infection intensities for the coccidium were higher in the hybrid abalone; of those infected 25% had grade 2 infections, and 75% had grade 3 infections, but the red abalone presented only grade 2 infection intensities. Therefore, the hybrid did not inherit non-susceptibility or resistance characteristics of the parental *H. discus hannai* and possessed biological conditions that could foster development of both parasites. Development of a culture based on this hybrid abalone should consider its susceptibility to infection by coccidian, WS-RLOs and the potential for developing the WS disease.

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