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J Fisheries Livest Prod 2017, 5:2 (Suppl)
http://dx.doi.org/10.4172/2332-2608-C1-009

Distribution of cryptic species as a specific response to environmental effects at large scale: The freshwater shrimp *Caridina indistinct* Calman, 1926 in the southeast Queensland

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Recent research suggests that morphologically cryptic species may differ notably in their ecological requirements and their tolerance to environmental conditions. However, it is still unclear what effect environmental stress has on the relative abundance of cryptic species, and whether broad differences among cryptic species in their distribution reflect differences in their tolerances to various environmental variables, specifically water quality requirements. There is much genetic study showing that many of freshwater species are harboring a number of cryptic species, which may occasionally occur in sympatry. In this study, we focused specifically on freshwater shrimp belonging to the *Caridina indistincta* complex in southeast Qld. Two hypotheses have been suggested in this study: 1) As the taxa have different distributions, their tolerance to water quality and elevation parameters also differ, 2) As the different cryptic species of *Caridina indistincta* rarely exist sympatrically, their responses to environmental variables and preference to the specific habitats will differ between species. Molecular work has been conducted for 147 shrimp specimens from 47 sites in 15 catchments across southeast Qld, by sequencing a fragment of the mitochondrial cytochrome c oxidase subunit I gene (*COI*). The molecular approach identified three cryptic species of *Caridina indistincta* (Sp. A, B & D) and showed that these cryptic species seldom exist together, with only three sites containing more than one species. Based on a multivariate analysis of water quality variables at each site, Sp. A could be differentiated from Sp. B and Sp. D, but Sp. B and Sp. D overlapped substantially.

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