WHAT: The effects of iron precipitates from acid sulfate soils on settlement, survival and early stage growth of Sydney rock oyster (SRO)

WHO & FUNDING: Tatt Sheng Lai, Angela Liu & A/Prof. Jesmond Sammut from UNSW. Dr. Michael Dove from NSW DPI. ; Funded by School of Biological Earth & Environmental Sciences. Special thanks to NSW DPI oyster hatchery staff Brandt Archer, Kyle Johnston, Lynne Foulkes, & Stephen O'Connor for their support.

BACKGROUND: Iron precipitates, originating from acidified drains and creeks in landscapes containing acid sulfate soils (ASS), commonly coat estuarine substrates including spat collectors and oyster leases downstream from their source. ASS has been identified as a significant threat to oyster production, and farmers suspect that iron precipitate on collectors are causing reduced spatfall.

This study investigated the effects of iron coating and substrate material (ceramic tiles vs. PVC tiles) on the settlement, survival and growth of SRO under controlled conditions. Effect of colour (orange) on larval settlement was also tested by including orange PVC tiles in the treatments. Orange tiles were tested because iron precipitation from ASS are usually orange in colour. Ceramic tiles were tested because it is a common substrate used in Indonesia to collect pearl oyster spat. PVC was tested because it is commonly used to collect SRO spat in Australia.

Pediveliger SRO larvae (> 250 µm) were stocked into aquaria containing a tile (either iron-coated ceramic tiles, non-iron coated ceramic tiles, iron-coated PVC tiles, non iron-coated PVC tiles or orange PVC tiles) to examine larval settlement, subsequent growth (21 days post-settlement) and survival of settled larvae.

WHAT WAS FOUND:

This study found that iron precipitates(from ASS) significantly reduced SRO settlement but did not affect the growth of spat during early post settlement stage. This result shows that iron precipitate primarily affects settlement of larvae. Furthermore, when comparing iron coated tiles, larval settlement was significantly higher in areas with thin iron coating vs. areas with thick iron coating. This shows that larvae actively avoid settling in areas with thick iron precipitate. Additionally, colour of iron (orange) had no significant impact on larval settlement. This showed it was factor other than colour of iron that were effecting SRO settlement. None of the treatments affected early post settlement survival of spat.

The study also found that substrate material (both with & without iron) did not affect larval settlement, however it did impact early stage growth rates. Larvae that settled on ceramic tiles had a significantly lower growth rate vs. larvae that settled on PVC tiles.

HOW WILL THIS HELP THE OYSTER INDUSTRY: This study has shown that iron can negatively impact the suitability of some surfaces for larval settlement. Therefore, it's recommended that farmers should avoid areas of estuaries affected by iron precipitate when collecting spat. Although ceramics are suitable for collecting pearl oyster spat, this study has shown that ceramics tiles are not suitable for SRO spat collection.

FURTHER INFORMATION: Belden Lai on beldenlai92@gmail.com