

# Effects of Low Oxygen and Hydrogen Sulfide on Crab Population

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Release of hydrogen sulfide from bottom sediment in eutrophic coastal environment associated with oxygen depletion has strong toxic effect on benthic and benthopelagic communities. Since the terrestrial input of toxic substances is legally regulated, hydrogen sulfide which can be produced by sulfate reduction is one of the most important autochthonous toxic substance.

In order to evaluate the combined effects of hydrogen sulfide and low dissolved oxygen on blue crab larvae, laboratory experiments on the toxicity to the blue crab larvae in different developmental stages were carried out. Field observations on the seasonal variation of hydrogen sulfide and dissolved oxygen in bottom water of Hiroshima Bay in the Seto Inland Sea, Japan were also conducted. From these results the fate of stocked seed population as well as natural larval population of blue crab was discussed.

In the coastal region of Hiroshima Bay, low oxygen ( $DO \leq 3.2 \text{ mg/l}$ ) and higher hydrogen sulfide ( $> 10 \mu\text{g/l}$ ) were observed in bottom water under the condition of summer stratification. Effect of hydrogen sulfide on survival rate after 48 hrs was significant at 5, 10 and  $20 \mu\text{g/l}$  level to zoea, megalopa and crab stage of the larvae, respectively. Larvae survival rate of zoea, megalopa and crab stage under low oxygen was significantly affected by  $DO \leq 3.4 \text{ mg/l}$ ,  $DO \leq 2.6 \text{ mg/l}$  and  $DO \leq 1.5 \text{ mg/l}$ , respectively. Combined effects of hydrogen sulfide and low oxygen were stronger than each single effect. Namely,  $5 \mu\text{g/l}$  hydrogen sulfide under  $3.4 \text{ mg/l}$  dissolved oxygen levels lowered the survival rate of zoea than that under either exposure to hydrogen sulfide or low oxygen.

From these results it is concluded that hydrogen sulfide observed in the bottom water in combination with low oxygen in summer affect the larval population of blue crab in the eutrophic region of Hiroshima Bay.