

庄河海域菲律宾蛤仔底播增殖区自身污染

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Self-pollution in *Ruditapes philippinarum* bottom-cultured area of Zhuanghe coast.YUAN Xiu-tang¹, ZHANG Sheng-li^{1,2}, LIU Shu-xi¹, LIANG Bin¹, LIANG Yu-bo¹, ZHANG Guo-fan³

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- 摘要
- 参考文献
- 相关文章

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摘要

采用生物沉积物捕集器和封闭式代谢瓶, 周年现场研究了庄河海域菲律宾蛤仔的生物沉积速率、排氨率和排磷率. 结果表明: 菲律宾蛤仔的生物沉积速率、排氨率和排磷率均具有明显的季节变化. 生物沉积速率为 $0.15\sim 1.47\text{ g}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$ (年均 $0.61\text{ g}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$); 其排氨率及排磷率分别为 $0.02\sim 0.40\text{ mg}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$ (年均 $0.17\text{ mg}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$)和 $0.01\sim 0.39\text{ mg}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$ (年均 $0.13\text{ mg}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$). 根据以上结果, 估算庄河海域底播增殖菲律宾蛤仔每年产生的生物沉积物达到 $5.46\times 10^7\text{ t}$ (干质量), 折合有机物 $9.07\times 10^6\text{ t}$ 、有机碳 $1.00\times 10^6\text{ t}$ 和有机氮 $1.18\times 10^5\text{ t}$; 而氨氮和磷酸盐分别为 $1.49\times 10^4\text{ t}$ 和 $1.15\times 10^4\text{ t}$. 表明浅海高密度、规模化菲律宾蛤仔增殖区自身污染严重, 其对环境的影响不可忽视.

关键词: 菲律宾蛤仔 生物沉积 氮、磷排泄 自身污染 庄河海域

Abstract:

By using sediment trap and closed respirator, a year-round *in situ* investigation was made on the bio-deposition rate, ammonia excretion rate, and phosphate excretion rate in the *Ruditapes philippinarum* bottom-cultured area of Zhuanghe coast. The three test rates of *R. philippinarum* all showed obvious seasonal variability, with the bio-deposition rate ranged in $0.15\text{--}1.47\text{ g}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$ (annual average $0.61\text{ g}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$), ammonia excretion rate ranged in $0.02\text{--}0.40\text{ mg}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$ (annual average $0.17\text{ mg}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$), and phosphate excretion rate ranged in $0.01\text{--}0.39\text{ mg}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$ (annual average $0.13\text{ mg}\cdot\text{ind}^{-1}\cdot\text{d}^{-1}$). Based on these, it was estimated that the annual bio-deposit production by the bottom-cultured *R. philippinarum* in Zhuanghe coast could reach as high as $5.46\times 10^7\text{ t}$ dry mass, amounting to $9.07\times 10^6\text{ t}$ organic matter (OM), $1.00\times 10^6\text{ t}$ organic carbon (OC), or $1.18\times 10^5\text{ t}$ organic nitrogen (ON), and the annual $\text{NH}_4^+\text{-N}$ and $\text{PO}_4^{3-}\text{-P}$ productions were $1.49\times 10^4\text{ t}$ and $1.15\times 10^4\text{ t}$, respectively. Our results suggested that for the large scale and high density bivalve culture in China coasts, the potential impacts of self-pollutants by filter-feeding bivalves on the environment should not be neglected.

Key words: *Ruditapes philippinarum* bio-deposition ammonia and phosphate excretion self-pollution Zhuanghe coast

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