國立臺灣海洋大學
海洋環境與生態研究所 專題討論

題目： A dilution technique for the direct measurement of viral production: a comparison in stratified and tidally mixed coastal waters （使用稀釋培養技術直接測量病毒生產量：成層和潮汐混合沿海水域的比較)

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The abundance of heterotrophic bacteria and viruses, as well as rates of viral production and virus-mediated mortality, were measured in Discovery Passage and the Strait of Georgia (British Columbia, Canada) along a gradient of tidal mixing ranging from well mixed to stratified. The abundances of bacteria and viruses were approximately 10^6 and 10^7 ml^{-1} , respectively, independent of mixing regime. Viral production estimates, monitored by a dilution technique, demonstrated that new viruses were produced at rates of 10^6 and 10^7 ml^{-1} h^{-1}across the different mixing regimes. Using an estimated burst size of 50 viruses per lytic event, ca. 19 to 27% of the standing stock of bacteria at the stratified stations and 46 to 137% at the deep-mixed stations were removed by viruses. The results suggest that mixing of stratified waters during tidal exchange enhances virus-mediated bacterial lysis. Consequently, viral lysis recycled a greater proportion of the organic carbon required for bacterial growth under non-steady-state compared to steady-state conditions.

本研究於 Discovery 水道及 Georgia 海峽(不列顛哥倫比亞省,加拿大)從一個潮汐混合均勻至成層的水域進行異營性細菌，病毒，病毒成長率及病毒造成細菌死亡率的研究。在混合均勻水域環境其細菌及病毒的數量在深度上並沒有數量差異，各為 10^6 及 10^7 mL^{-1}。同時在此混合水域環境，使用病毒稀釋培養技術(dilution technique)，可量測到病毒生產速率可高達 10^6 to 10^7 mL^{-1} h^{-1}。如果使用平均一個細菌經病毒感染後可爆裂 50 個病毒數(burst size) 來計算，本研究推估在成層水域約有 19 到 27%及在混合水域環境約有 46 至 137% 的細菌現存量是被病毒所移除的。這發現的結果使得作者建議當成層水域被潮汐

混合交換時，病毒對細菌造成的死亡率會加強。所以，在混合不穩定的階段其病毒作用產生的再生性有機碳對細菌的成長所需會比成層穩定階段來的重要。