國 立 臺 灣 海 洋 大 學
海洋環境與生態研究所 專題討論

題目：淡水和海水混合對熱帶河口域病毒和細菌的影響

Effects of freshwater and seawater mixing on virio- and bacterioplankton in a tropical estuary

作者：MAIMOUNA CISSOKO, ANNE DESNUES, MARC BOUVY, T E LESPHORE SIME-NGANDO, EMMA VERLING AND YVAN BETTAREL

出處：Freshwater Biology (2008) 53, 1154–1162

報告人：陳凱文 碩一

指導教授：蔡安益

報告日期：01/05/2022

Summary

1.Estuaries are interesting sites to examine virus–bacteria interactions since they may vary gradually or abruptly in salinity, which presumably requires physiological, genetic and ecological adaptations. To explore such adjustments in tropical areas, freshwater and seawater samples were collected in the estuarine system of the River Senegal and experimentally subjected to abrupt mixing of seawater with freshwater and vice versa.

2.Production rates of freshwater bacteria (measured by the tritiated thymidine incorpo- ration method) and of viruses (measured by the dilution method) sharply declined immediately after seawater addition, which was followed by a spectacular recovery of the surviving bacterial and viral populations within 24 and 48 h, respectively.

3.Conversely, neither marine bacteria nor viruses were significantly affected by mixing with freshwater. This suggests that the turbulent front between ascending tidal sea water and out welling fluvial freshwater is a more favorable environment for marine bacterioplankton, which may take advantage of massive bursts of freshwater cells resulting from osmotic shock.

4.In both mixing experiments, the dynamics of virioplankton production followed that of the bacteria within 24 h, suggesting that viruses can rapidly respond to dramatic shifts in the abundance and community composition of bacterial hosts.

中文摘要

1.河口域的環境由於水體鹽度可能逐漸或突然變化，可能影響微生物生理，遺傳和生態適應，因此此類環境是研究病毒和細菌相互作用的最佳地點。為了探索熱帶地區河口域的環境微生物的調適，本實驗於塞內加爾河河口系統中收集了淡水和海水樣本，並進行了海水與淡水不同比例的混合實驗。

2.生活在淡水環境細菌的生產量（胸腺密錠法測量）和病毒生產量（稀釋法測量）在海水添加後立即急劇下降，隨後分別在 24 和 48 小時後存活的細菌和病毒族群的生產量會劇烈增加。

3.相反，原本生存在海洋細菌和病毒生產量都沒有因加入淡水混合而受到顯著影

響。這表明上升的潮汐海水和匯入的河流淡水之間的湍流鋒面對海洋細菌來說可能利用了大量淡水細菌爆裂所產生的物質生長，而成為一個更有利的環境。
4.在兩個添加混合實驗中，病毒生產量是在細菌生產量增加後的 24 小時才增加，此現象表示著病毒會隨著宿主細菌數量和群落組成的轉變而產生急劇改變。