

Estimates of virus- versus nanoflagellate grazing-induced mortality of picoplankton in the brackish waters: a seasonal study in two stations of differing trophity

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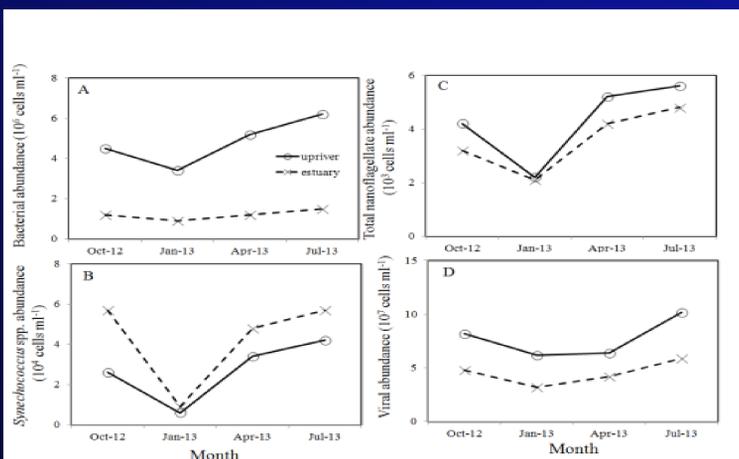
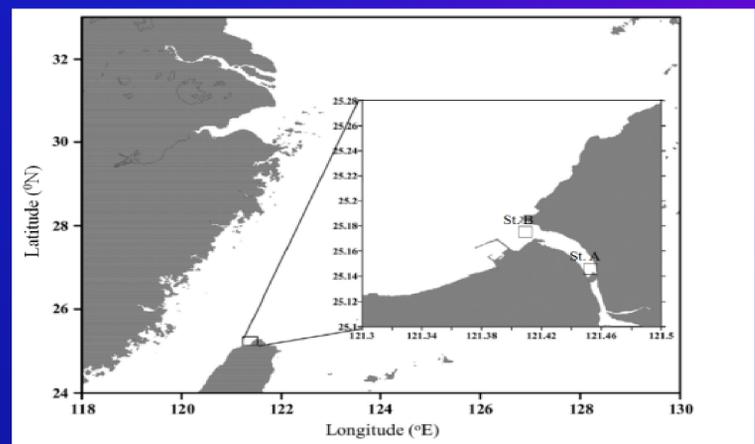
Abstract

To better understand picoplankton dynamics (abundance and distribution) in the surface waters of upriver the Danshui River and its estuary, we assessed nanoflagellate-induced and virus-induced mortality of bacteria and *Synechococcus* spp. during different seasons (October, 2012 and January, April and July, 2013) using a modified dilution technique. During the study period, total losses (grazers and viruses) were responsible for 89% to 97%, and 69% to 82% of the bacterial production at the upriver and estuary site, respectively. Furthermore, bacterial mortality resulting from nanoflagellate grazing were generally higher than those resulting from viral lysis in the upriver region, while *Synechococcus* spp. losses appeared to be mainly due to viral lysis upriver and in the estuary. Our dilution experiments suggested that nanoflagellates largely depend on bacteria as an important energy source there.

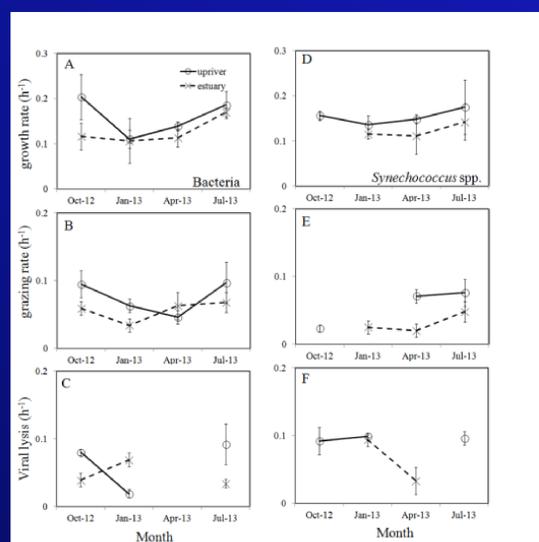
Materials and Methods

Surface water (1 m depth) was collected from two sites within the Danshui River (St. A) and the Danshui River estuary (St. B) (Fig. 1). The upper zone of the estuary (St. A) is limited tidal influence and is rich in inorganic nutrients and organic matter. The St. B is influenced by tide and subjected to seawater intrusion.

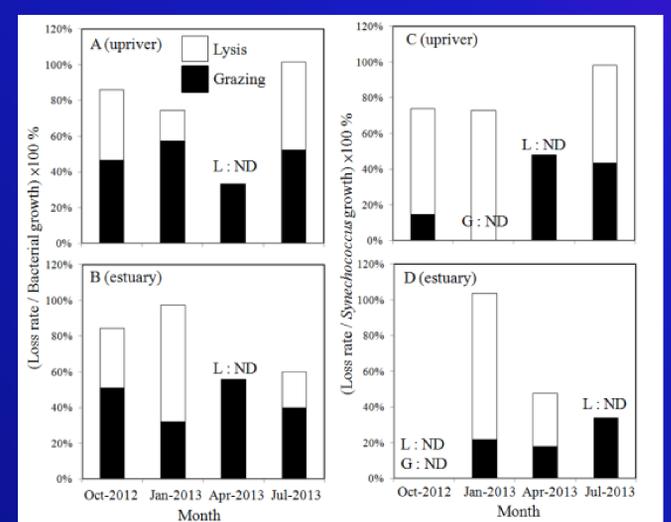
Results



(Fig.2)



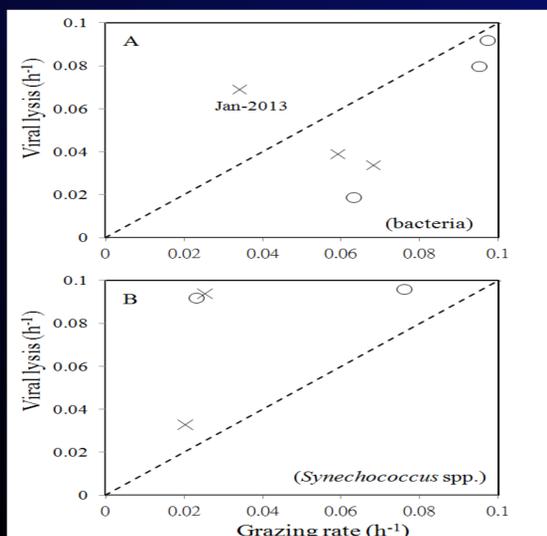
(Fig.3)



(Fig.4)

Conclusions

Although this study only sampled surface waters during select periods of the year and only provided a partial picture of virus-nanoflagellate-picoplankton interactions, we were able to provide insight into complexity of viral lysis and grazing as potential regulatory factors on bacterial and *Synechococcus* spp. dynamics in the river and estuarine studied.



(Fig.5)