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Studies on diurnal variations in bacterial and heterotrophic nanoflagellate abundance in different environments during summer

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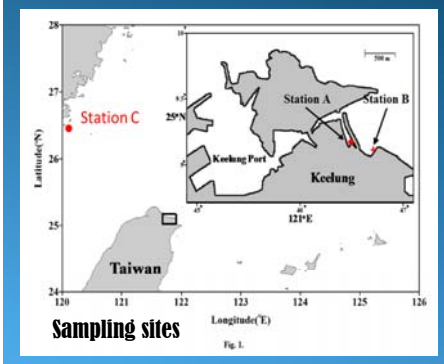
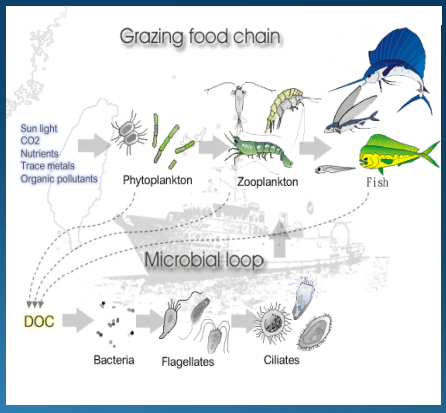


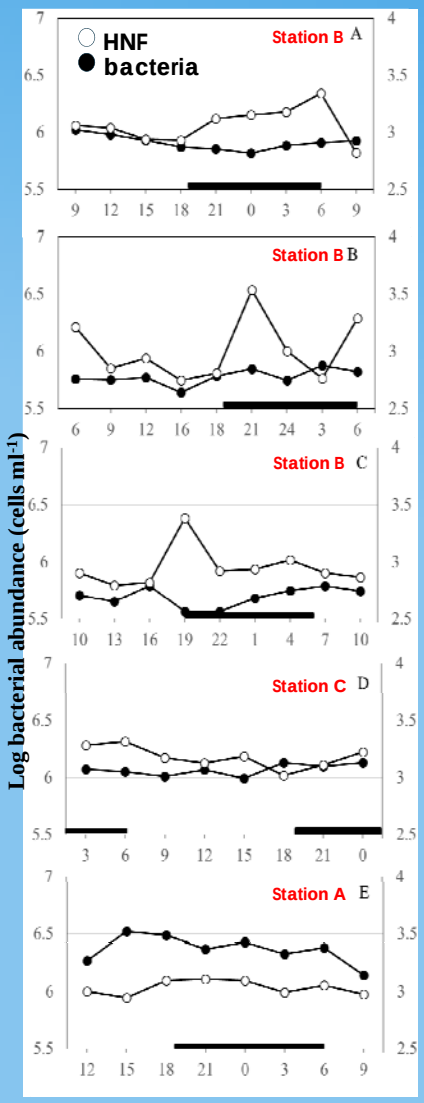
Bacteria are important decomposers of organic matter and recyclers of inorganic nutrients in marine environments. Bacteria are prey to nano- and microzooplankton-sized grazers, especially heterotrophic nanoflagellates (HNF), constitute the primary bacterivores and conduits of bacterial production to higher trophic levels.

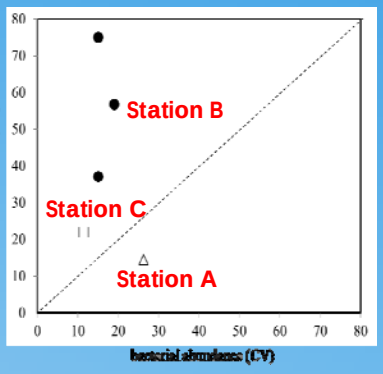
Certainly, physical, chemical and biological factors affect the population dynamics of microbial communities in any aquatic ecosystem. Microbes respond quickly to temporal and spatial variations in their environments.

More is known on interactions of bacterial and HNF abundance of long-term (seasons) and different environments in aquatic systems. To our knowledge, experimental test of short-term diel variations of the relationship between bacteria and HNF are scarce in marine systems.



Results





coefficient of variation, CV
$CV = (s/\bar{x}) \times 100\%$

For a better understanding, we used Lotka-Volterra equation to predict the control factors on diel variations in bacteria and HNF.

The results suggest that the value of amplitude of HNF was larger than bacteria, which is established to be bacterial production is lower than loss rates (k1 decrease).

On the other hand, which HNF production is higher than loss rates (k4 decrease), the value of amplitude of HNF is smaller than bacteria is observed in this study.

Lotka-Volterra equation

$$\frac{\Delta[Prey]}{\Delta[Time]} = k1[Prey] - k2[Prey][Predator]$$

$$\frac{\Delta[Predator]}{\Delta[Time]} = k3[Prey][Predator] - k4[Predator]$$

k1	k2	k3	k4
0.01	0.00001	0.00000001	0.01