

國立臺灣海洋大學  
海洋環境與生態研究所 專題討論

中文題目：

核電廠出水口與鄰近地區腦珊瑚—韋氏腦紋珊瑚 (*Platygyra verweyi*) 的共生群落與宿主基因結構

英文題目：

Symbiont communities and host genetic structure of the brain coral

*Platygyra verweyi*, at the outlet of a nuclear power plant and adjacent areas

作者：

Keshavmurthy, S ; Hsu, CM ; Kuo, CY ; Meng, PJ ; Wang, JT; Chen, CLA

出處：Molecular Ecology (2012) 21, 4393–4407

報告人：林子程 環態所碩一

指導教授：識名信也 教授

報告日期：2023/05/24

中文摘要

珊瑚共生體 (holobionts) 是否能透過耐壓力和 (或) 耐熱共生藻的選擇性共生 (shuffling)、產生耐熱的宿主基因型或兩者兼具等方式，應對氣候變遷下海水升溫的問題，對珊瑚的生存至關重要。本次研究探討了自 1984 年起台灣南部墾丁運行的核電站出水口排放之熱水對於珊瑚礁內共生體—共生藻

(*Symbiodinium*) 組成和珊瑚宿主—韋氏腦紋珊瑚 (*Platygyra verweyi*) 種群遺傳學的影響。在夏季該地點的平均水溫為 29.0°C，比鄰近有珊瑚礁的水域高出 2.0 - 3.0°C。將研究數據與出水口 12 km 範圍內其他地點的相同物種進行了比較，發現韋氏腦紋珊瑚在所有地點都發現具有共生藻類型 C3 (對熱敏感)、D1a (耐熱) 的其中一種或兩種，而在核電廠出水口中主要的共生藻類型 D1a，C3 在種群中的比例則隨著距出水口越遠而增加。使用粒腺體與細胞核標記方法對韋氏腦紋珊瑚進行遺傳分析，顯示不同地點間沒有遺傳分化。墾丁周遭海域韋氏腦紋珊瑚共生藻組成的變化表明，這種珊瑚可能通過與耐熱共生藻的選擇性共生以適應長期的熱壓力，而宿主在適應中的作用尚無定論。

國立臺灣海洋大學  
海洋環境與生態研究所 專題討論

中文題目：

核電廠出水口與鄰近地區腦珊瑚－韋氏腦紋珊瑚 (*Platygyra verweyi*) 的共生群落與宿主基因結構

英文題目：

**Symbiont communities and host genetic structure of the brain coral**

***Platygyra verweyi*, at the outlet of a nuclear power plant and adjacent areas**

作者：

**Keshavmurthy, S ; Hsu, CM ; Kuo, CY ; Meng, PJ ; Wang, JT; Chen, CLA**

出處：**Molecular Ecology (2012) 21, 4393–4407**

報告人：林子程 環態所碩一

指導教授：識名信也 教授

報告日期：2023/05/24

### **Abstract**

In the context of rising seawater temperatures associated with climate change, the issue of whether coral holobionts deal with this challenge by shuffling their associations with stress- and/or heat-tolerant *Symbiodinium*, by generating heat-resistant host genotypes, or both is important for coral survival. In this study, the composition of communities of the endosymbiont *Symbiodinium* and the population genetics of the coral host *Platygyra verweyi* were examined in a reef impacted by hot-water discharged from the outlet of a nuclear power plant in operation in Kenting, Southern Taiwan since 1984. The water at this site is 2.0 - 3.0 °C warmer than adjacent reefs in summer, which have an average seawater temperature of 29.0 °C. The data were compared with those for the same species at other sites within 12 km of the outlet site. *P. verweyi* was associated with one or both of *Symbiodinium* types C3 (heat sensitive) and D1a (heat tolerant) at all sites with the latter being the dominant at the nuclear power plant outlet. The proportion of C3 in populations increased gradually with increasing distance from the hot-water discharge. Genetic analysis of the *P. verweyi* host using mitochondrial and nuclear markers showed no genetic differentiation among sites. Changes in the composition of *Symbiodinium* types associated with *P. verweyi* among closely located sites in Kenting suggested that this coral might have acclimatized to the constant thermal stress by selective association with heat-tolerant *Symbiodinium* types, whereas the role of the host in adaptation was inconclusive.