

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：塑膠微粒對造礁珊瑚的生長和健康的影響具有物種特異性

英文題目：Impacts of microplastics on growth and health of hermatypic corals are species-specific

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### Abstract

Coral reefs are increasingly affected by the consequences of global change such as increasing temperatures or pollution. Lately, microplastics (i.e., fragments < 5 mm) have been identified as another potential threat. While previous studies have assessed short-term effects caused by high concentrations of microplastics, nothing is known about the long-term effects of microplastics under realistic concentrations. Therefore, a microcosm study was conducted and corals of the genera *Acropora*, *Pocillopora*, *Porites*, and *Heliopora* were exposed to microplastics in a concentration of 200 particles L<sup>-1</sup>, relating to predicted pollution levels. Coral growth and health, as well as symbiont properties were studied over a period of six months. The exposure caused species-specific effects on coral growth and photosynthetic performance. Signs of compromised health were observed for *Acropora* and *Pocillopora*, those taxa that frequently interact with the particles. The results indicate elevated energy demands in the affected species, likely due to physical contact of the corals to the microplastics. The study shows that microplastic pollution can have negative impacts on hermatypic corals. These effects might amplify corals' susceptibility to other stressors, further contributing to community shifts in coral reef assemblages.

### 中文摘要

珊瑚礁受到全球變遷的影響越來越大，例如溫度升高或污染。近期，塑膠微粒（即碎片<5毫米）已被確定為另一種潛在威脅。雖然之前的研究已經評估了高濃度塑膠微粒在短時間內的影響，但對實際濃度下塑膠微粒長期影響的研究較少，因此，進行了一項微觀的研究，將軸孔珊瑚屬(*Acropora* sp.)、鹿角珊瑚屬(*Pocillopora* sp.)、微孔珊瑚(*Porites* sp.)和藍珊瑚屬(*Heliopora* sp.)的珊瑚暴露在濃度為每公升 200 個顆粒的塑膠微粒中，與預測的污染數值相當。研究珊瑚在六個月期間，珊瑚的生長和健康以及共生藻的特性。結果發現，塑膠微粒對珊瑚的生長和光合作用效率具有物種特異性影響，軸孔珊瑚屬和鹿角珊瑚屬的珊瑚觀察到健康受到影響，這類群的珊瑚與塑膠微粒相互作用更加頻繁。結果顯示，受影響物種的能量需求增加，可能是因為珊瑚與塑膠微粒的物理接觸，本研究也表明，塑膠微粒污染會對造礁珊瑚產生負面影響，這些影響可能會放大珊瑚對其他壓力的敏感度，進而導致珊瑚礁群落發生變化。