

The Seasonal Movement and Abundance of the Starfish, *Asterias rubens* in Relation to Mussel Farming Practice: A Case Study from the Menai Strait, UK

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ABSTRACT

Mussel cultivation is the most valuable sector of the bivalve aquaculture industry in the United Kingdom, and the largest mussel fishery in Britain is located in the Menai Strait, North Wales. The common starfish, *Asterias rubens* is highly abundant and widely distributed throughout British waters, affecting the distribution and abundance of prey species such as the common mussel, *Mytilus edulis*. This study investigates the potential influence of the Menai Strait mussel fishery on seasonal patterns of abundance, distribution, and migration of *A. rubens*, and aspects of their reproductive strategy. Starfish and mussel populations were surveyed and sampled monthly over a 2-y period using a visual survey technique and by trawling the seabed during the mussel harvest period. Maximum starfish density ($40,586 \pm 5,648$ starfish·ha⁻¹) and percentage mussel coverage (~40%) were recorded on a commercial subtidal mussel bed. Mussel density and starfish abundance increased seasonally between April and July and declined between September and March, with the loss of 1.7×10^6 starfish attributed directly to the activities of the mussel fishery. Starfish migration onto subtidal mussel beds is deemed to be in response to the transplantation of high densities of mussels and trawling activity, and the reduction in starfish numbers over the winter a direct result of harvesting activities. Estimates of starfish reproductive condition determined from trawl samples collected during the same period suggest that starfish were aggregated and highly abundant at sites without mussel cultivation during their peak reproductive state. *Asterias rubens* migration into deeper water is believed to be in response to increasing seawater temperature where gravid individuals spawn in close proximity to improve fertilization.

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