The interaction between ghost shrimp activity and seagrass restoration

INTERNATIONAL SYMPOSIUM: ECOLOGY OF LARGE BIOTURBATORS IN TIDAL FLATS AND SHALLOW SUBLITTORAL SEDIMENTS - FROM INDIVIDUAL BEHAVIOR TO THEIR ROLE AS ECOSYSTEM ENGINEERS

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In Western Port, Victoria, dense populations of ghost shrimps inhabiting intertidal and shallow subtidal soft sediments have the potential to hinder the restoration of seagrass. The loss of seagrass from large areas of soft-sediments in Western Port (70% since 1970) has increased the availability of favourable habitat for recruiting ghost shrimp larvae. Because shrimp activity may have a negative effect on seagrass growth it may be difficult to successfully reintroduce seagrass into dense shrimp beds. Early work by T. Suchanek showed that bioturbation by the ghost shrimps inhibited growth and survival of seagrass by increasing water turbidity (thereby reducing light available for photosynthesis) or by physically smothering the seagrass. This study quantified sediment ejection rates and particle sizes ejected from ghost shrimp burrows to investigate the potential of the Western Port ghost shrimp community to inhibit survival of transplanted seagrass cores. A subsequent insitu experiment (quantifying seagrass survival in the presence/absence of ghost shrimp) tested the hypothesis that ghost shrimp activity would negatively influence survival and growth of seagrass transplants.

Sediment ejected from burrows equated to a 0.5-1.25 cm layer being added to the surface of the sandflat each week. A weak positive relationship between expulsion rate and water temperature was found, with rates tending to be lower in the colder months. Grain size distributions in sediment ejected from ghost shrimp burrows did not vary with time, but were significantly different from distributions collected from core samples of the surrounding sediment. This indicates that ghost shrimps were clearly sorting the sediments, preferentially ejecting grains in the size class 125-250 μm and avoiding grains >500 μm. At both sites, the sediment suspended in water samples collected over the sandflats had a significantly greater proportion of fine particles than sediments ejected from burrows. Preliminary results from the insitu experiment indicate that seagrass cores survive in the presence of bioturbating ghost shrimp. The significance of these findings will be discussed.