

Seagrass wrack degradation: The effects of wrack diversity and macroinvertebrates on degradation rates in south Western Australia.

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Very little is understood about degradation dynamics in marine habitats and what is known centres heavily around single species degradation of algal wrack. How fast wrack degrades has significant implications for nutrient recycling and energy transfer through trophic levels. Litter diversity is identified as a potential factor affecting degradation rates in terrestrial literature, however whether or not increasing diversity results in additive or non-additive degradation is debatable. To date, only one study has addressed the effects of increasing seagrass wrack diversity on degradation rates, and despite the fact that seagrasses and algae often occur together, no studies have been conducted to assess the effects of mixing these wrack types. Increasing diversity may affect degradation directly by altering the chemical environment, or indirectly by changing the decomposer communities present. Alternatively, it has been suggested that the presence of macroinvertebrates can significantly affect degradation through increased leaf fragmentation and faecal production increasing bacteria numbers, however there is limited evidence to suggest macroinvertebrates graze directly on seagrasses. A sub-tidal litterbag and caging experiment was conducted to investigate how the presence of fauna and wrack diversity affects degradation rates of seagrass. Regardless of the wrack diversity tested, biomass loss was significantly greater where fauna access was restricted ($p < 0.05$). Mixing seagrass and algae appeared to have an inhibiting effect on seagrass degradation. Degradation rates of seagrass were significantly higher when seagrass wrack was dominant (13.76% to 31.41% biomass loss) compared to the algae dominated treatments (10.67% to 22.68% biomass loss). However, for total biomass loss, degradation was significantly higher in the mixed composition treatments (21.71% to 39.06% biomass loss) indicating that where algae are available it will be the first component to degrade. This work has highlighted that fauna are not important for seagrass wrack degradation in these habitats and increasing diversity does not enhance degradation of seagrass. The faster degradation where fauna were reduced could be due to increased bacterial degradation through an effect of reduced grazing on bacteria cells by macroinvertebrates.