POPULATION DISTRIBUTION AND MORTALITY OF THE ANTARCTIC SCALLOP

Presenter

Maggie Burdell
The University of Georgia, Athens, GA

Summary

E-poster Finalist

Background: The Antarctic scallop, *Adamussium colbecki,* is an ecosystem engineer—a key organism that links benthic, pelagic and planktonic habitats in Antarctica—but little is known about its populations, including size distributions, recruitment, mortality, and whether its death assemblage (as a proxy for fossil populations) faithfully records the life assemblage living in the coldest seawater on Earth (-1.97 ^{o}C). These baseline data are crucial to bracket ecosystem change predicted under climate warming scenarios and to compare with their fossil record. The objectives were to determine if *A. colbecki* living under semi-permanent sea ice had similar size distributions, recruitment, and mortality/death assemblage patterns at four sites within Explorers Cove, Antarctica. **Methods:** Underwater ice diver videos from each site were subdivided into equal time clips (representing ~10 meters). For each clip, the relative size of each scallop was binned into small (1–5 cm), medium (5.1–8.9 cm), and large (9–13 cm). The number of live, articulated dead and disarticulated dead were counted for each size bin and were used to estimate mortality rates for each site. Total disarticulated valves were divided by 2 to estimate total dead scallops per site. **Results**: Although the four sites were located ~200 m apart, the abundance of live scallops ranged from 111 to 668. At all sites, the majority were medium-sized, making up 51.86% of the live and 53.10% of the dead scallops. Large-sized scallops made up 34.48% of the live and 39.36% of the dead, whereas small scallops were quite rare: 1.80% to 17.96% of the live, with few dead. Dead scallops represented 22% to 72% (mean 47%) of the total live and dead assemblage. Mortality rates varied from 0.066 to 0.316 among sites. **Conclusions:** The Antarctic scallop has very patchy distributions under semi-permanent sea ice, likely tied to patchiness in austral summer sea ice algae. The relatively high number of dead valves (articulated and disarticulated) and mortality rates—often higher than those in temperate habitats—are likely driven by patchiness in voracious predators, like sea stars. High fidelity in death assemblages that faithfully record both the abundance and size structure of the living scallops bodes well for comparing fossil assemblages. However, under semi-permanent sea ice, recruitment is not common. With Antarctica's predicted warming, little recruitment and enhanced predation from presumed invasive durophagous predators may ultimately lead to the demise of this important Antarctic ecosystem engineer.

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