8-2011

The Role of Crassostrea Virginica Hemocytes in Shell Formation: Ex Vivo Mineral Deposition by Cultured Hemocytes

Emily A. Untener

Douglas C. Hansen

Karolyn Hansen
University of Dayton, khansen1@udayton.edu

discussed. Improvements in the quality of the forecasts require validation through observations of bloom location and intensity. Continued improvement in the analysis can lead to data sets that will allow seasonal and climatic forecasts.

THE ROLE OF *CRASSOSTREA VIRGINICA* HEMOCYTES IN SHELL FORMATION: *EX VIVO* MINERAL DEPOSITION BY CULTURED HEMOCYTES.

Emily A. Untener [1], Douglas C. Hansen [2], Karolyn M. Hansen [1].
[1] University of Dayton, 300 College Park, Dayton, OH, 45469, USA.
[2] University of Dayton Research Institute, 300 College Park, Dayton, OH, 45469, USA.

The Eastern oyster, *Crassostrea virginica*, produces a composite ceramic shell composed of the calcite polymorph of calcium carbonate and various proteinaceous organic constituents. There are two models for shell biosynthesis: the matrix-mediated model which states that mineral nucleation occurs on secreted organic matrix components, and the hemocyte-mediated model which states that mineral nucleation occurs intracellularly and nuclei are deposited at the shell formation front. In this study we examine the role of circulating refractive hemocytes in shell formation with the goal of further elucidating the mechanism of calcite nucleation and growth. Oyster hemocytes were collected from notched adult oysters and cultured *ex vivo* for up to 96 hours with resultant mineral formation on glass substrates. Hemocytes were also cultured on biomedical implant substrates (316L stainless steel and titanium alloy Ti6Al4V) with similar results. X-ray diffraction studies of isolated hemocytes reveal the presence of the calcite polymorph in *C. virginica* hemocytes. The *ex vivo* culture of mineral-bearing hemocytes opens up the possibility for site-directed mineral deposition on a variety of substrates of economic and biomedical interest.

EXPANDING POST-DISEASE RECOVERY IN POPULATIONS OF THE ENDANGERED BLACK ABALONE (*HALIOTIS CRACHERODII* LEACH 1814) AT SAN NICOLAS ISLAND, CALIFORNIA

Glenn R. VanBlaricom.
Washington Cooperative Fish and Wildlife Research Unit, School of Aquatic and Fishery Sciences, University of Washington, Mailstop 355020, Seattle, WA, 98195-5020, USA.

Black abalones (*Haliotis cracherodii* Leach, 1814) are found in rocky intertidal habitats from northern California, USA, into northern Baja California, Mexico. US populations were listed as "endangered" in 2009, largely due to mass mortalities associated with a bacterial disease known as withering syndrome (WS). Twenty population-scale surveys for black abalones were completed between 1981 and 2010 in nine permanent study locations distributed around the periphery of San Nicolas Island, California (SNI). WS was first seen at SNI in spring 1992, causing a 99% reduction in Island-wide density by 2001, with catastrophic mortalities observed at all nine study sites. Since 2002 black abalone numbers have increased at four study sites, three on the south side of SNI and one (site 3) on the north side. The increase was twelve-fold at sites 5 and 7 and threefold at site 8. Numbers at site 3 have shown high inter-annual variance but have increased twenty-four fold since 2001. Numbers at the five remaining study sites have remained low and constant or have continued to decline. Patches of black abalones with recent positive trends in density show resistance to WS and have obvious potential for contributions to the development of restoration strategies for depleted populations.

THE USE OF LOSS AND SETTING EFFICIENCY TO MAXIMIZE SPAT PRODUCTION OF EASTERN OYSTERS (*CRASSOSTREA VIRGINICA*) AND ITS APPLICATION TO A PRODUCTION HATCHERY.

Emily A. Vlahovich, Donald W. Meritt.
University of Maryland, Center for Environmental Science, 2020 Horns Point Road, Cambridge, MD, 21613, USA.

One measure of success in an oyster hatchery is setting efficiency. Increasing efficiency can involve keeping larvae in tanks as long as possible, which can result in loss of larvae to the sides of the tanks. This study used loss and setting efficiency to determine when introduction of larvae into setting tanks would maximize spat production. *Crassostrea virginica* larvae were grown under normal hatchery conditions. Once retained on a 200 micron sieve, they were placed in a rearing cone. The cone was drained, larvae were counted, a portion was placed in a setting vessel, and the remaining larvae were returned to the rearing cone. This generated daily loss and setting efficiency values, and occurred every day until 10% of larvae remained. These data were used in a hypothetical scenario to determine when spat production is maximized. Both the highest setting efficiency and lowest spat production occurred on day five. The greatest spat production occurred on day two. These data suggest that spat production may be increased by introducing larvae into setting tanks two days after they are retained on a 200 micron sieve, or by increasing the time larvae spend in setting tanks.

THE CAUSES OF ACIDIFICATION IN CHESAPEAKE BAY AND CONSEQUENCES TO OYSTER SHELL GROWTH AND DISSOLUTION.

George G. Waldbusser.
Oregon State University, 104 COAS Admin. Bldg., Corvallis, OR, 97331-5503, USA.

Ocean acidification, due to increasing release of fossil fuel emissions, has become recognized as a threat to shell forming animals in the world's oceans. However many important marine

JOURNAL OF SHELLFISH RESEARCH

VOLUME 30, NUMBER 2 AUGUST 2011