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The Mineralization Front of the Eastern Oyster is Cellular

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2007. Approximately 96 oysters for each recruitment set and each sampling region were genotyped for twelve microsatellite markers. Estimates of N_e were completed by both moments-based and pseudo-likelihood temporal analyses. Preliminary results indicate low estimates of N_e with considerable spatial and temporal variability.

MODULATION OF GENE EXPRESSION IN HAEMOCYTES FROM *OSTREA EDULIS* IN RESPONSE TO AN IN VITRO *BONAMIA OSTREAE* INFECTION. **Benjamin Morga, Isabelle Arzul, Segarra, Faury, Bruno Chollet,** and **Renault.** IFREMER, Avenue Mus du loup, La Tremblade, Poitou Charentes, 17390, France.

Bonamiosis due to the parasite *Bonamia ostreae* is a disease affecting the flat oyster *Ostrea edulis*. *Bonamia ostreae* is a protozoan, affiliated to the order of Haplosporidia and to the phylum of Cercozoan. This parasite is mainly intracellular, infecting haemocytes, cells notably involved in the defence mechanisms of the oyster.

Suppression subtractive hybridisation cDNA library was performed to identify genes differently expressed (up or down-regulated) during an *in vitro* infection of haemocytes by *Bonamia ostreae*. Several genes of interest have been identified including genes involved in cytoskeleton, respiratory chain, membrane receptors, detoxification, regulation proteins and immune system. Real time PCR tests were performed to study the relative expression of these candidate genes during an *in vitro* infection of haemocytes by purified parasites. The elongation factor alpha was selected as housekeeping gene.

Infection seems to particularly favour expression of genes including actin related protein, filamin, liporeceptor, mitogen-activated protein kinase (MAPK organizer 1) and omega glutathione-s-transferase (OGST). Interestingly, genes involved in defence mechanisms like SOD, tetraspanin or TIMP appeared down-regulated suggesting that parasite escape degradation by inhibiting expression of such genes.

These results contribute to better understand how the parasite installs and survives within haemocytes.

SEX RATIO IN DELAWARE BAY OYSTER POPULATIONS: PROTANDRY, POPULATION DYNAMICS, AND FISHERY MANAGEMENT. **Jason M. Morson, Eric N. Powell, Kathryn A. Ashton-Alcox, Yungkul Kim,** and **Rebecca Marzec.** Rutgers University, 6959 Miller Avenue, Port Norris, NJ, 08349, USA.

The sex ratio of oysters is determined by a dynamic interplay between recruitment and mortality as 75% of the animals are thought to be protandric hermaphrodites. Sex is thought to be determined by a two allele system with MF animals being permanent males and FF animals protandric. Theoretically, the relationship stabilizes the sex ratio of large animals at 3:1, but also sensitizes the species to overfishing because fishing targets females as does disease. We examine the state of the sex ratio in Delaware Bay oyster populations. Bay-wide, the percent female is 48%, significantly below a 1:1 ratio. Bay-wide, animals >75 mm are 75% functional females. This is the expected 3:1 ratio. Small animals in many populations are 0% female, consistent with the expectation that all animals are born functional males. The data support the theorized MF/FF sex determination system in crassostreids and exclude options where FF animals would be permanent females. Simultaneous hermaphrodites comprise 1.2% of the population, but the fraction declines with increasing size, suggesting that these animals were caught during the protandric switch. Overall, animals exposed to fishing are 64% female. Thus, the fishery and Dermo disease exert a disproportionate impact on female mortality.

SHELLFISHERIES AND MARINE BIOTOXINS: A REVIEW OF THE SOURCES, TOXINS, AND DETECTION METHODS. **Steve Morton.** NOAA/NOS, 331 Fort Johnson Road, Charleston, South Carolina, 29410, USA.

All coastal areas of the United States are at risk for potential outbreaks of harmful algal blooms, commonly referred to as red tides. These blooms, at times, may contain naturally occurring marine biotoxins. Depending on location, shellfisheries are at risk for contamination of a number of these toxins including saxitoxin, domoic acid, brevetoxin, and okadaic acid. Human ingestion these toxins can cause the human syndromes of paralytic shellfish poisoning (PSP), amnesic shellfish poisoning (ASP), neurotoxic shellfish poisoning (NSP) and diarrheic shellfish poisoning (DSP). This presentation will give an overview of these toxins, their source organisms and detection methods available for each toxin class. New and emerging classes of toxins recently discovered will also be discussed.

THE MINERALIZATION FRONT OF THE EASTERN OYSTER IS CELLULAR. **Andrew S. Mount[1], Neeraj V. Gohad[1], Mary Beth Johnstone[1], Karolyn M. Hansen[2],** and **Douglas C. Hansen[2].** [1]Clemson University, Clemson, SC, 29634, USA; [2]University of Dayton Research Institute, Dayton, OH, 45469, USA.

Eastern oyster immune blood cells will adhere and subsequently deposit complex polycrystalline assemblies onto polished metal alloy surfaces, all of which occurs in the absence of a pre-formed organic matrix. We have achieved first order control over shell formation as demonstrated by the calcification of complex shell layers on a variety of metal alloy and glass test surfaces. These experiments have enabled us to visualize the earliest onset of controlled biomineralization by hemocytes, the circulating immune cells of the oyster. Contrary to the matrix-mediated paradigm, we have observed that a pre-formed organic matrix is *not* the first event in biomineralization, but rather all of shell formation is mediated almost exclusively by the organism's blood cells.

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