tically modify the local environment, especially through biodeposition and the provision of additional habitat, features which serve to encourage species enrichment. The relative importance of mussels as space monopolisers and/or ecosystem engineers will provide a particular focus of this paper.

TWO STORIES OF PHYTOPLANKTON CONTROL BY BIVALVES IN SAN FRANCISCO BAY: THE IMPORTANCE OF SPATIAL AND TEMPORAL DISTRIBUTION OF BIVALVES. **Janet K. Thompson,** U.S. Geological Survey, Menlo Park, CA 94025.

The introduction of the Asian clam, *Potamocorbula amurensis*, into San Francisco Bay has resulted in changes to the food web within the northern bay (NB) but not within the southern bay (SB). *P. amurensis* invaded the bay in 1986, became the dominant member of the benthic community within one year in NB and within three years in SB. Large declines in phytoplankton biomass in NB appear to be due to "over-grazing" by *P. amurensis* populations which are estimated to filter the shallow reaches of NB in excess of twice a day. Because high turbidity restricts net positive primary production to the shallow reaches of NB and limits the net primary production in the deep areas of SB, shallow water grazing controls system-wide phytoplankton biomass throughout the system. SB phytoplankton biomass has not changed with the invasion of *P. amurensi*, despite similar density and biomass levels of *P. amurensis* in the deep water throughout the system. There are, however, large differences in the temporal and spatial distribution of shallow water *P. amurensis* in the NB and SB. Shallow water *P. amurensis* live 1 ½–2 years in the NB but only 8–9 months in the SB, and the annual phytoplankton bloom in SB occurs during the three month period when *P. amurensis* are absent from the shallow water.

GENETICS AND BREEDING

RESEARCH AND DEVELOPMENT ON SUMINOEGAKI, *CRASSOSTREA ARIAKENSIS*, FOR AQUACULTURE IN VIRGINIA, AND OTHER ACTIVITIES WITH NON-NATIVES. **Standish K. Allen, Jr.,*** Aquaculture Genetics and Breeding Technology Center, Virginia Institute of Marine Science, College of William & Mary, Gloucester Point, VA.

For several years, VIMS has been examining the biology and potential of non-native species for aquaculture development in the Chesapeake Bay. Earlier work has shown potential for *C. gigas* in higher salinity sites only and *C. ariakensis* generally throughout the Bay. With the goal of developing "put-and-take" aquaculture using sterile triploids, the Aquaculture Genetics and Breeding Technology Center has begun more extensive R&D on a number of fronts for *C. ariakensis*. Using stocks brought to the East Coast about 8 years ago, in 1999 we produced triploids for field trials, specifically to examine reversion and aspects of their marketability. From previous experiments, it is clear that reversion is a feature in triploid *C. ariakensis* as well. We have also attempted to produce tetraploid *C. ariakensis* with some difficulty. After dozens of attempts, some dozen or so putative tetraploids are in hand. We are also examining population genetic structure in collections throughout Southeast Asia. Early evidence points to discreet population structure among locales. Native Suminoegaki from southern and northern China were imported in 1999 and we produced F_1 diploids and triploids from the southern population. Larval culture for this species is still problematic in our hands and so we will be trying to optimize this fundamental step by working closely with collaborators in China. For *C. ariakensis* and also for more general work with non-natives, we have upgraded several key aspects of our physical plant, including development of a dedicated, land-based holding facility for long-term non-native research.

MICROSATELLITE MARKERS AS A TOOL TO STUDY REPRODUCTIVE SUCCESS IN THE PACIFIC OYSTER, *CRASSOSTREA GIGAS* (THUNBERG), CROSSED UNDER CONTROLLED HATCHERY CONDITION. **Pierre Boudry** and **Bertrand Collet,** Laboratoire IFREMER de Génétique et Pathologie, BP133, 17390 La Tremblade, France; **Florence Cornette, Véronique Hervouet** and **François Bonhomme,** Laboratoire Génome, Populations, Interactions, 1 quai de la Daurade, 34200 Sète, France.

Oysters, like many marine species have a very high fecundity. Previous studies have shown that populations, from both hatcheries and the natural environment, have very low *Ne/N* ratios. These observations reveal high variation in reproductive success. In order to study individual reproductive success under controlled conditions, we used microsatellite markers to quantify parental contributions in *in vitro* crosses (5 males and 5 females) of *Crassostrea gigas*, the Pacific oyster. High polymorphism of the microsatellites (more that 50 alleles per locus) eased the parentage identifications. The results of a cross allowing gametic competition were compared with the results from a second cross where the gametes of the same parents were kept separate for each parental combination until after fertilization. The progeny were then sampled at different stages of development and the parental contributions determined to follow their evolution through time. Despite the fact that equal numbers of gametes were mixed for each male and each female, the contributions of these parents to the resulting progeny was highly unbalanced at both larval and juvenile stages in both crosses. We demonstrated that variation in individual reproductive success is due to both spermatic competition and selective phenomena at early stages.