

**Genetic Drift and Effective Population Sizes in Commercial Stocks of the
Pacific Oyster *Crassostrea gigas* on the U.S. West Coast**

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Culture of the Pacific oyster *Crassostrea gigas* along the west coast of the United States relies almost exclusively on seed produced by a few major commercial hatcheries. Because this introduced species reproduces naturally in only a few localities, commercial stocks have in recent years been maintained in isolation from natural stocks. While such isolation makes possible domestication and genetic improvement, it necessitates the careful management of these captive gene pools. Improper broodstock management and ill-conceived breeding programs result in inbreeding, reductions in genetic diversity, and declines in performance.

Using starch gel electrophoresis and specific enzyme assay we have recently scored individual differences at 14 polymorphic enzymes in samples of natural set from Dabob Bay, Wa., and in samples of third generation hatchery stocks derived from such natural set and reared on commercial growout beds in Willapa Bay, Wa., and Humbolt Bay, Ca. Hatchery stocks differ markedly from the naturally recruiting population at many loci. Assuming that the Dabob Bay sample represents the population from which the commercial stocks were derived, we calculate that the genetically effective population sizes of the Willapa and Humbolt stocks are only 42 ± 15 and 8 ± 2 , respectively. Genetic divergence of these commercial stocks is thus due to random genetic drift. Insofar as oyster broodstock are routinely selected from production inventory, continued use of restricted effective population sizes would lead rapidly to extensive inbreeding of commercial broodstocks and declines in growth and reproductive performance.