DEMOGRAPHIC STATISTICS AND ANNUAL MOLTING PROBABILITIES OF THE ADULT FEMALE DUNGENESS CRAB (CANCER MAGISTER) IN NORTHERN CALIFORNIA

by

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ABSTRACT

Adult female Dungeness crabs (Cancer magister) can be inseminated only while in a soft-shell condition immediately after molting. Population modelers have therefore assumed that all adult female Dungeness crabs undergo an annual molt. Based on this assumption, a tag-recovery project was initiated in northern California to determine demographic statistics of the adult female stock. Of 12,037 adult female crabs tagged and released, recoveries of 492 crabs in the commercial fishery showed that a large proportion of adult female Dungeness crabs fail to molt annually and that extrusion of viable eggs does not require annual molting and mating.

A size-specific annual molting probability estimator was developed which accounts for commercial gear selection biases. Estimates using this technique showed that annual molting probabilities decline with increasing adult female size and become zero above 155 mm. Therefore, size and age are weakly correlated. Size-related population statistics are probably more meaningful than age-related statistics because molt increments and molting probabilities appear to be more dependent on size than age.

Width frequency distribution separation failed to allow year class strength extraction and size-specific survival rate estimation. However, comparisons of width frequency histograms across years show apparent variation in year class strength.

Tag-recoveries provided an annual survival rate estimate of 0.2 for crabs fully vulnerable to the commercial gear (> 155 mm). Truncation of width frequency distributions over larger female sizes suggests that survival rates for smaller female crabs are greater. The extremely low survival rate and the cessation of molting for large adult females imply that adult female Dungeness crabs may become senescent after reaching a terminal size.

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> Fisheries is a practical art and not a science. We must look for a rational explanation of the observed phenomena.