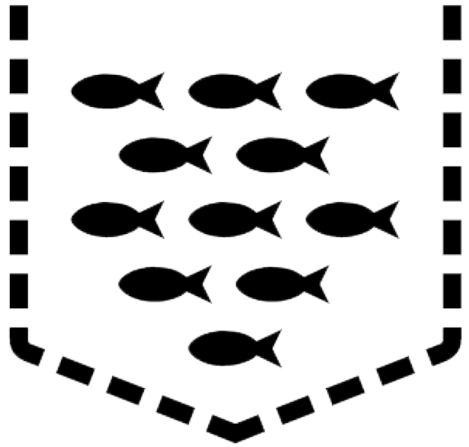
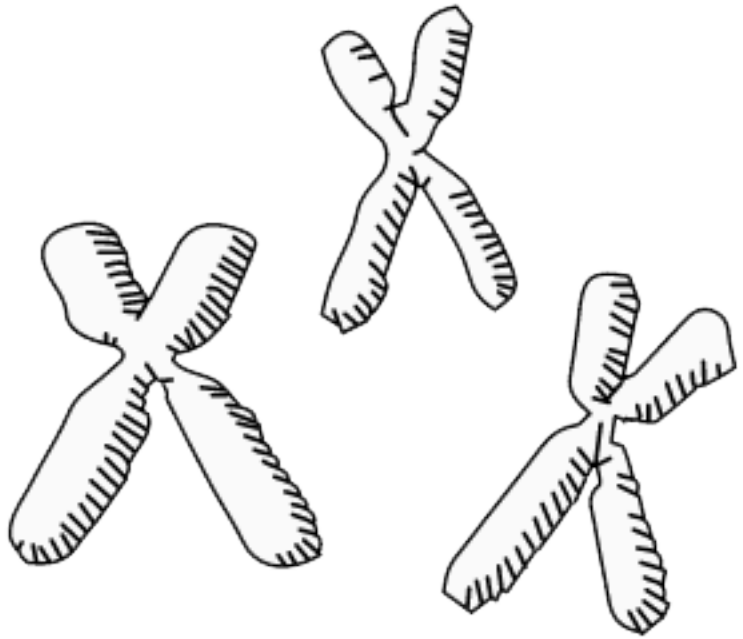
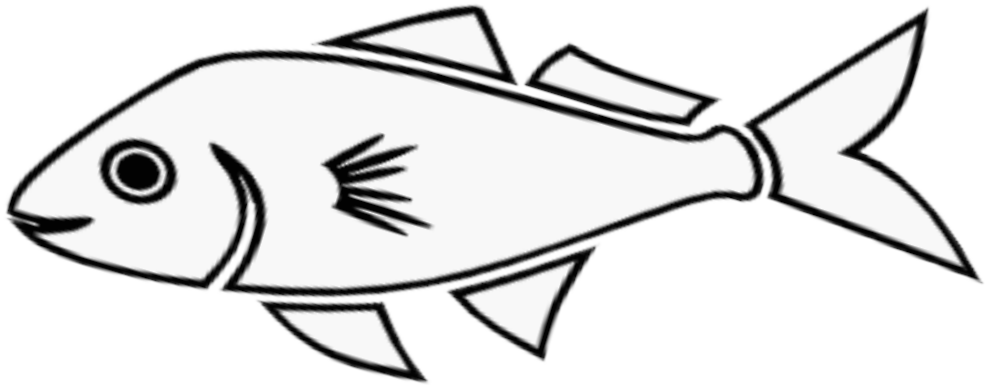


AQS 224 Fish Breeding

Dr. F. Sertel SEÇER





1. Week Domestication, Genetic Improvement Practices in Aquaculture

2. Week Selective breeding / production in seafood

3. Week Theoretical Foundations of Cultivation and Selection

4. Week Breeding Programs

5. Week Strategies for Breeding

6. Week Selection and Mating Design Methods

7. Week Estimation of Breeding Values

8. Week Genotype and Environment Interaction

9. Week Calculating the Selection Response

10. Week Side Effects in Fish Breeding Practices

11. Week Biotechnology in Fish Farming

12. Week Reproduction Techniques in Fish Breeding 1

13. Week Reproduction Techniques in Fish Breeding 2

14. Week Economic Evaluation of Fish Farming

12. Week

Reproduction Techniques in Fish Breeding 1

- Gynogenesis
- Androgenesis
- Triploidy

- Gynogenesis is a special form of reproduction that has been known to occur in nature. During gynogenesis, the egg is activated by a genetically inert sperm that has been treated with ionising or ultraviolet radiation.

Gjedrem, T., & Baranski, M. (2010)

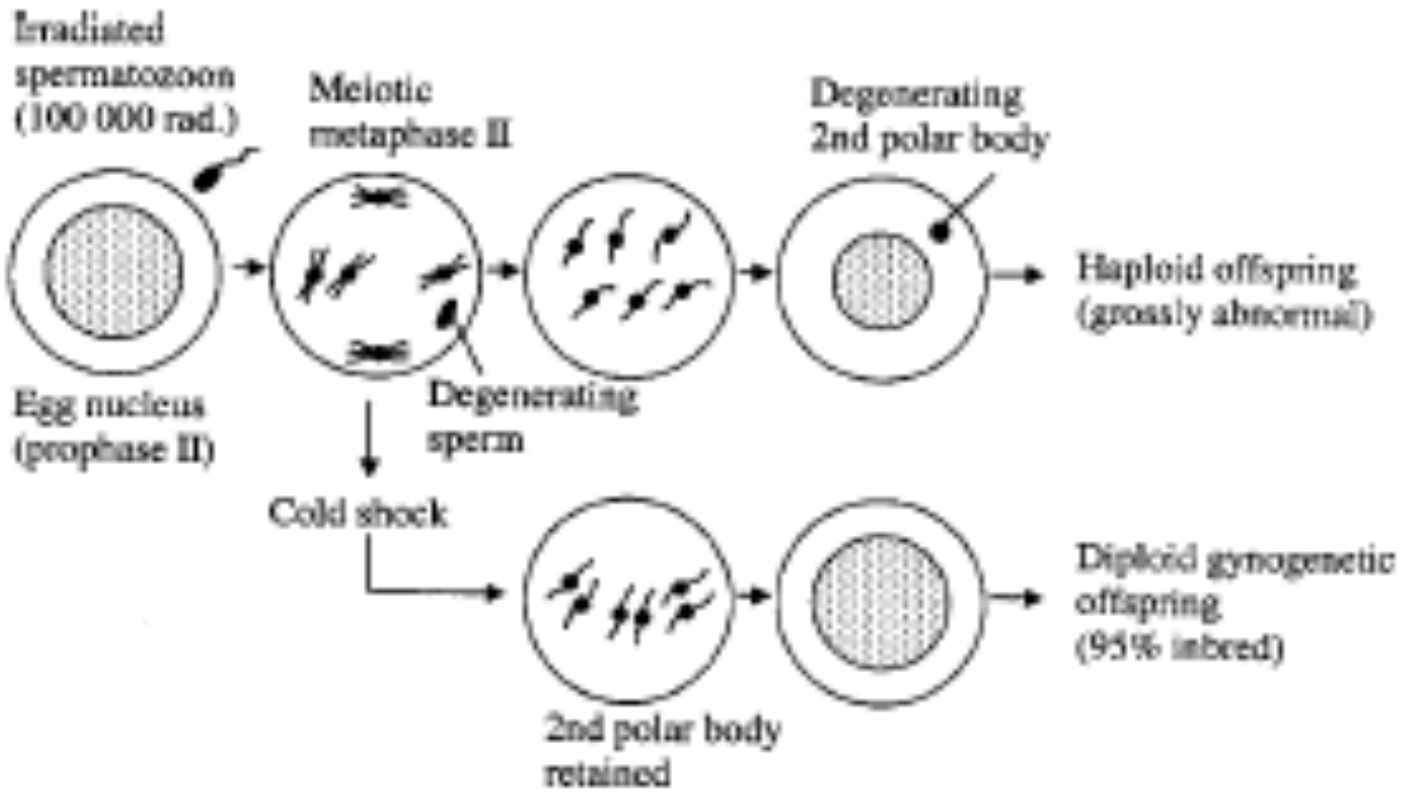


Fig. 15.1 Schematic presentation of induced gynogenesis. Reproduced from Purdom (1993) by permission of Chapman and Hall

Gjedrem, T., & Baranski, M. (2010)

- To induce gynogenesis, a shock is applied to block secretion of the second polar body. If this is performed on eggs fertilised by viable sperm, the second polar body will be retained and a triploid animal will be produced with two sets of chromosomes from the egg and one set of chromosomes from the sperm

Gjedrem, T., & Baranski, M. (2010)

Triploid fish and shellfish are used for farming in some countries for the following reasons:

- Since the animals are sterile, escapees will not breed with and affect wild stocks
- In most species with early sexual maturation, triploids are of interest since they are sterile and will continue to grow while the diploids will produce gonads.

Gjedrem, T., & Baranski, M. (2010)

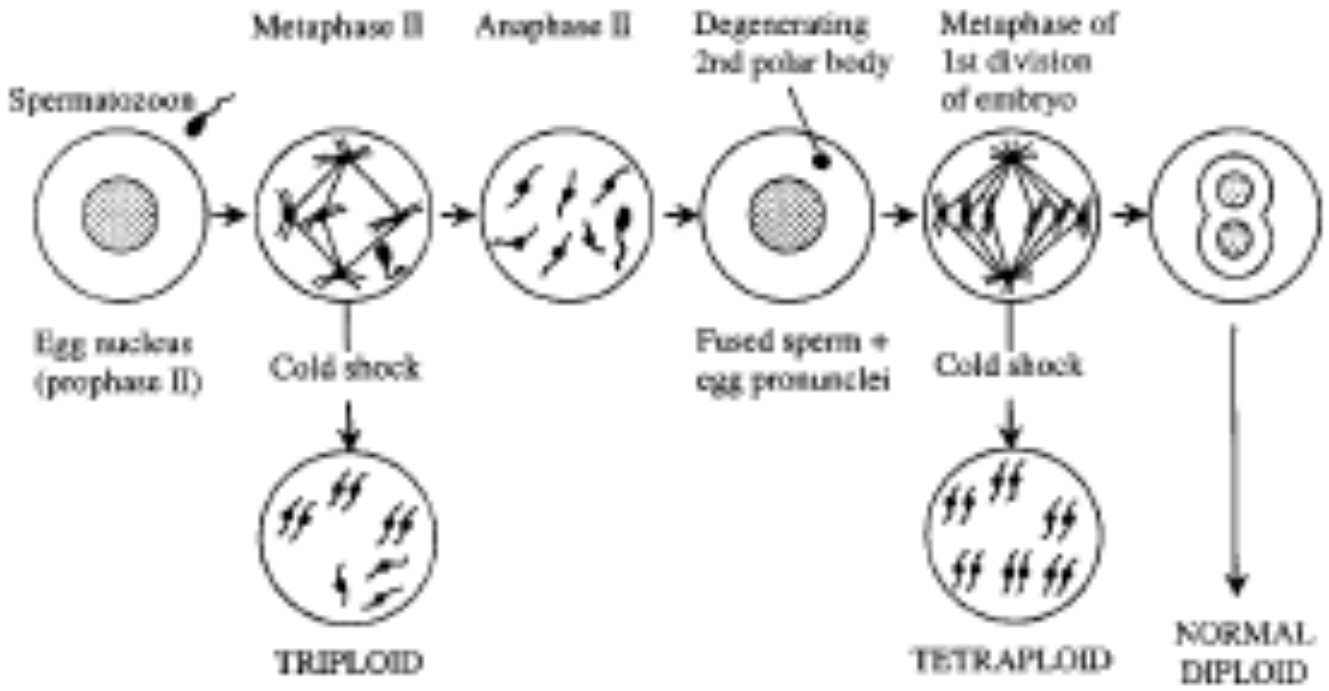


Fig. 15.2 Diagrammatic representation of induced polyploidy. Reproduced from Purdom (1993) by permission of Chapman and Hall

Gjedrem, T., & Baranski, M. (2010)

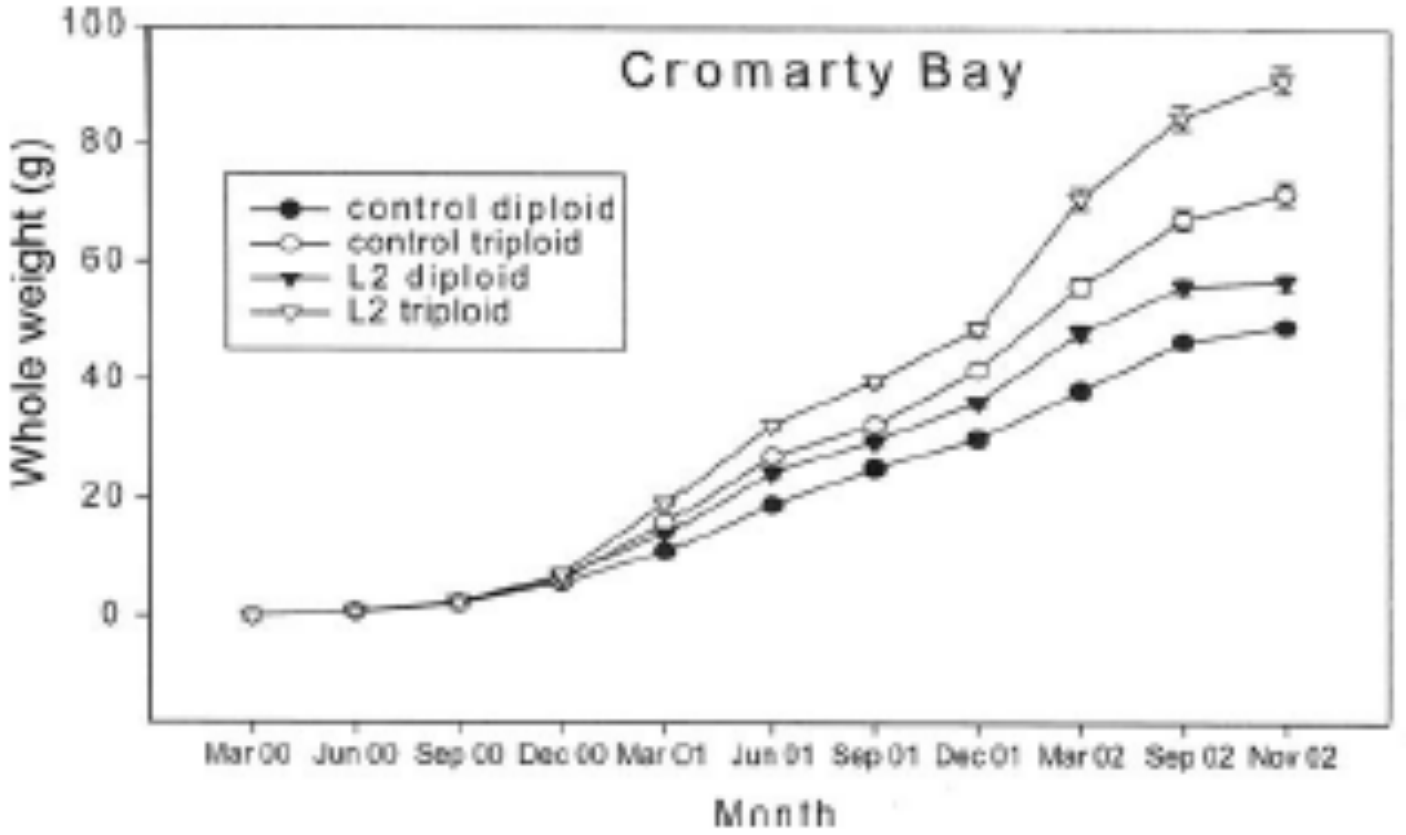


Fig. 15.3 Whole weights of diploid and triploid control and selection lines of Sydney rock oysters, *Saccostrea glomerata*, at Cromarty Bay in Port Stephens, Australia from March 2000 – November 2002. Reproduced from Hand et al. (2004) by permission of Elsevier Science

Gjedrem, T., & Baranski, M. (2010)

Several methods have been investigated to reduce this problem and produce monosex progeny in this species:

- The addition of male hormone (17 **α**-methyl-testosterone) in first feeding produces close to 100% phenotypic males
- The addition of female hormone (diethylstilboestrol) in first feeding produces close to 100% phenotypic females
- The crossing of certain tilapia species yields a higher frequency of males, for example Oreochromis niloticus x O. aureus and O. niloticus x O. hornorum
- Trained personnel can sex tilapia fingerlings and thus separate males and females
- The production of monosex populations with YY or XX chromosomes.

Gjedrem, T., & Baranski, M. (2010)

Reference

- Gjedrem, T., & Baranski, M. (2010). *Selective breeding in aquaculture: an introduction* (Vol. 10). Springer Science & Business Media.