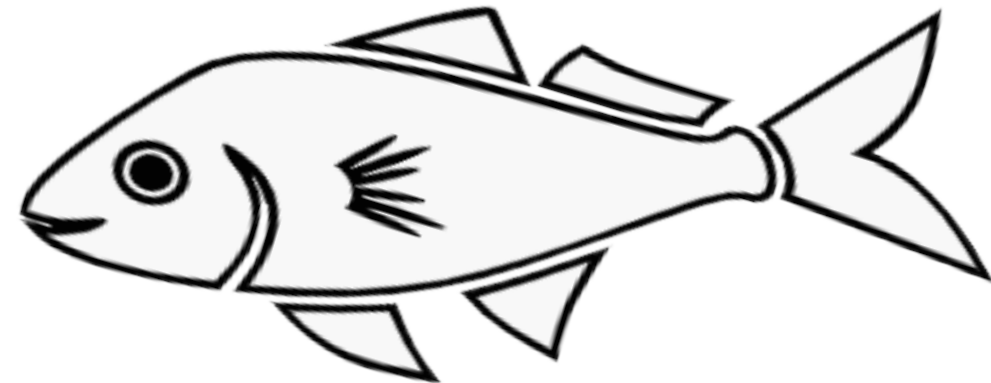
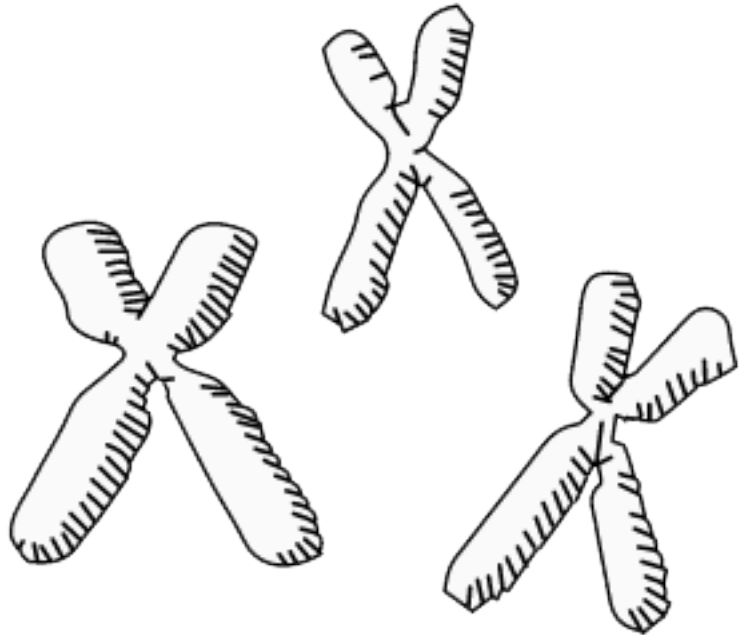


AQS 224 Fish Breeding

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

5. Week

Strategies for Breeding

- In breeding
- Cross breeding
- Pure breeding

- A well documented pedigree is a key tool to avoid inbreeding, however in a closed population, inbreeding will inevitably accumulate over time. As a general rule, increases of 0.5% or less per generation are desirable, and up to 1% per generation tolerable.

- The objective is to obtain offspring expressing hybrid vigour or heterosis.
- From a breeding perspective, crossbreeding is the opposite of inbreeding; inbreeding increases homozygosity whilst crossbreeding increases heterozygosity.

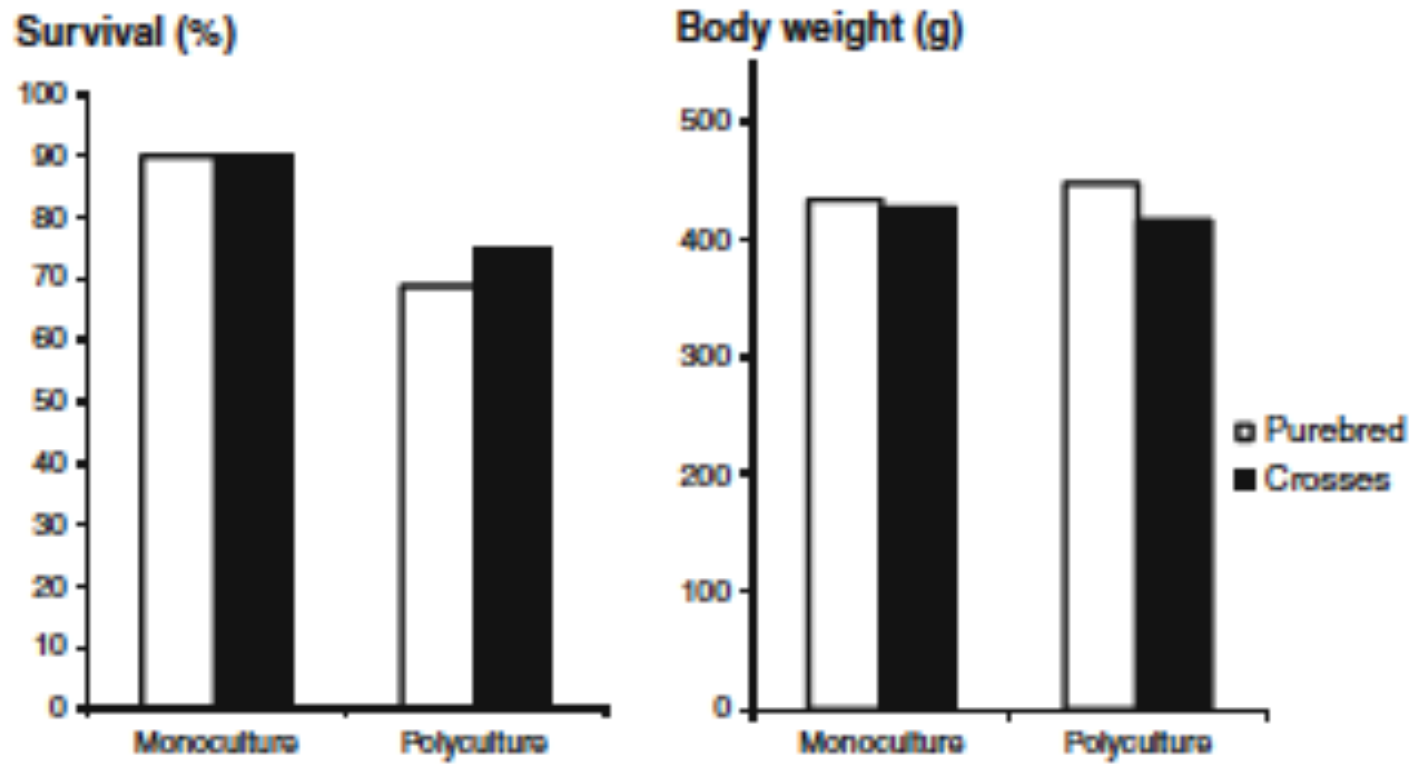


Fig. 6.1 Survival from tagging to harvest and harvest body weight of purebreds and crosses of rohu carp in monoculture and polyculture production systems. Reproduced from Reddy et al. (2003) by permission of Central Institute of Freshwater Aquaculture, India

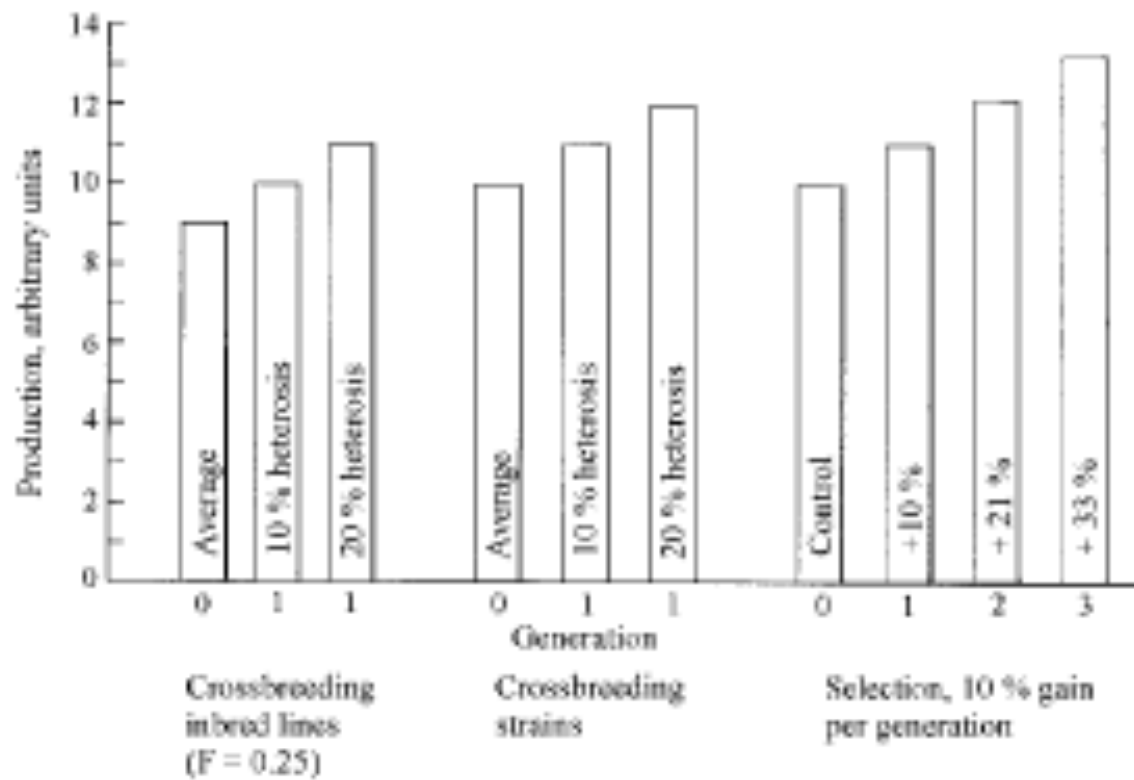


Fig. 6.2 Efficiency of crossing inbred lines and strains with medium and high heterosis compared with relatively low genetic gain from selection. Reproduced from Gjedrem (1985) by permission of Springer

- A combined selection and crossbreeding strategy called reciprocal recurrent selection (RRS) was developed by Comstock et al. (1949) and Dickerson (1952). This design, described in detail by Falconer and Mackay (1996), is quite complicated and involves making many crosses between two or more strains or inbred lines.

- Mating of unrelated animals within the same population is known as purebreeding.
- In practice, this means that the relationship between the animals that are mated is approximately the same as the average relationship between animals in the population.

- Purebreeding is relatively easy to perform, and is particularly effective when a strain is identified to be equal to or better than alternative strains. Inadvertent inbreeding is a serious risk when applying the purebreeding strategy, and must be minimised as much as possible through avoiding the mating of close relatives like full-sibs, half-sibs and cousins.

Reference

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