

SPAWNING TECHNIQUES: INDUCED BREEDING, ARTIFICIAL AND NATURAL SEX-REVERSAL, HYBRIDIZATION

Because development occur externally, it is possible to direct what phenotype sex is. During early embryology, an embryo is phenotypic ally, neither male or female in that it does not possess ovaries, testes, or other characteristics associated with the reproductive systems. Instead an embryo possess embryological pre=cursors of ovaries and testes (primordial germ cells), and not at this stage an embryo is “totipotent” because it could develop into either male or female. (It is different for each species), a chemical signal originated from a gene or set of genes, and this signal ‘informs’ the totipotent tissue which may be develop. Once this occurs and the tissues complete its development, the fish becomes either a phenotype male or phenotype female. There is a window of time, during which phenotype sex can be altered, and this window is specific. If a fish injects or absorbs anabolic steroids during this period, the steroid can direct the development of the totipotent cells. The exact dosage, duration of feeding, beginning and ending dates, and access to natural sources of food are major factors that determine the success of these endeavours.

General methods used to produce either monosex female populations, either by feeding sexually undifferentiated fry rations that contain anabolic steroids or by raising fry in water that contains a dilute concentration of anabolic steroids. It major goal in tilapia farming is to produce all male population in order to prevent reproduction and to eliminate females, which grow more slowly than males. To accomplish this, swim-up fry are typically fed rations containing 60mg of 17 α -methy/testosterone.kg fed for 30 to 60 days. This usually changes about 90-100% of the females into male which creates a population that is 95-100% male.

In salmon farming, the goal is to produce all female population in order to eliminate precocious males who die after they mature. To accomplish this, when salmon fry first begin to feed they are typically fed rations containing 20mg of 17 β -estradiol/kg feed for 40 to 60 days. The amount of hormone consumed by each fish is miniscule and most is eliminated rapidly. For instance, it is found rainbow trait exceeds 69% of ingested 17 β -methy/testosterone within 24 hours and also 0.9% of injected 17 α -methy/testosterone remained Juvenile T. aurea 21 days after it was removed from the diet. This means that the hormones used to sex reverse fish might be detectable only in parts per billion when sex-reversed fish reach marketable size, so the use of these hormones should pose no health hazards.

HYBRIDIZATION

This is the mating of genetically different groups from the same species (intra-specific hybridization) or from different species (inter-specific hybridization). Inter-generic hybrid is requires when parents from two different generic are crossed. Hybridization can be used to combine good traits from two different species into one group of fish or to transfer a characteristic of one group to another.

USES

Hybridization is for the production of new breeds or strains. It involves the production of uniform products. Processing of plants, and consumers often desire uniform products. It is the most efficient method of producing uniform progeny. It involves the production of monosex populations and for the production of hybrids to be stocked in natural bodies of water that are unable to maintain self-reproducing population.

One thing that hybridization generally does not do is produce good brood stock; meaning not to egg/kg female, but to the ability of the hybrids to produce above average progeny. If hybrids do not produce above average progeny (unless they exhibit material heterosis) because their superiority is not original and is disrupted during gametogenesis, because hybrid superiority is due to interactions, when hybrids reproduce, their progeny exhibit a wide range of interaction effects. Although hybridization can be used to create new breeds and thus provide new pools that

can be exploited by selection, hybridization is mainly used to produce superior animals and plants for grow-out. Selection is used to produce superior brood stock. Hybridization has been used to improve productivity in catfish culture as a stop-gap method until selection could be employed to create a better strain of channels catfish. Some hybrids crosses produce monosex population. Monosex population has been produced by inter-specific hybridization (hybridization of two species) in sunfish. The most famous and most important example is that which occurs in tilapia. It was discovered that progeny produced by the hybridization of two species were all males.