ADULT TRIPLOIDS IN A RAINBOW TROUT FAMILY

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ABSTRACT

Six triploid individuals were found in a full-sib family of 11 adult rainbow trout (*Salmo gairdneri*) from a domesticated hatchery stock. The triploid individuals were normal in size and external appearance, had underdeveloped gonads, and showed no evidence of 3n/2n chimerism or mosaicism. *XXY* triploids were males, suggesting that the *Y* chromosome is male determining in trout. Because they may avoid production losses associated with sexual maturation in normal fish, triploid trout and salmon could potentially be useful in fish culture.

TRIPLOIDY is tolerated to very different degrees among different groups of vertebrates. Mammalian triploids are inviable and apparently never survive long past birth, although viable diploid/triploid chimeras have been found in some species (CHU, THULINE and NORBY 1964; NES 1966; DUNN, MCENTEE and HANSEL 1970; NIEBUHR 1974). Triploidy also substantially reduces viability in chickens (BLOOM 1972; MONG *et al.* 1974), but some triploid individuals do survive to adulthood (OHNO *et al.* 1963; ABDEL-HAMEED and SHOFFNER 1971).

Triploids are much more viable in lower vertebrates. Triploidy has been observed in unisexual species and in hybrids between unisexual and bisexual species of fish, amphibians and reptiles, and occasionally in bisexual species and their interspecific hybrids in fish and amphibians (references in CUELLAR and UYENO 1972; GOLD and AVISE 1976; ALLEN and STANLEY 1978). Triploidy has also been experimentally induced in fish and amphibians, using thermal shocks and other treatments applied shortly after fertilization (FANKHAUSER 1945; VALENTI 1975; TOMPKINS 1978; and others).

Among salmonid fish, triploid individuals have been found in rainbow trout (CUELLAR and UYENO 1972; GRAMMELTVEDT 1974), brook trout (ALLEN and STANLEY 1978) and rainbow trout × brook trout hybrids (CAPANNA, CATAUDELLA and VOLPE 1974). There has been interest in the potential use of triploids in fish culture and management (PURDOM 1972, 1976; GJEDREM 1976). Attempts to induce polyploidy in salmonids have been discussed by SVARDSON (1945), LINCOLN, AULSTAD and GRAMMELTVEDT (1974). REFSTIE, VASSVIK and GJEDREM (1977) and SMITH and LEMOINE (1979). REFSTIE, VASSVIK and GJEDREM (1977) reported producing embryos that were a mosaic of polyploid and diploid cells in

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