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Sustainable Aquaculture for a Secure Future

Title: **Comparative and evolutionary analysis in natural diploid and tetraploid weather loach Misgurnus anguillicaudatus based on cytochrome b sequence data in central China**

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Abstract: To obtain the phylogenetic relationship between diploid and tetraploid *Misgurnus anguillicaudatus*, the mitochondrial cyt b gene in the diploid and tetraploid weather loach were isolated and sequenced. The DNA sequences were analyzed using MEGA 3.0 software to determine the phylogenetic relationship. Forty-five variable sites among cyt b gene sequences and 18 amino acid substitutions occurred within the diploid and tetraploid loaches as deduced from the nucleotide sequences analysis of the cyt b gene. The nucleotide pairwise distance between diploid and tetraploid loach ranged from 0.001 to 0.025. Phylogenetic analysis revealed evolutionary relationships between diploid and tetraploid loach. Our results indicated a significant difference between diploid and tetraploid loach about the cyt b gene. AMOVA analysis indicated that there were no significant genetic variations within diploid loaches (Fst = 0.2529, P>0.05) and within tetraploid loaches (Fst = 0.0564, P<0.05), neither. However, significant genetic differences were found between diploid and tetraploid loaches (Fst = 0.7634, P<0.05). Thus, it is concluded that no reproductive isolation was found within the same cytotypes of different localities, but there was reproductive isolation between these two cytotypes. The diploid loach existed before the tetraploid loaches in nature. The pres-

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ent study is first to describe the phylogenetic relationships of nature polyploidy weather loach using mtDNA cyt b gene.

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