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Sustainable Aquaculture for a Secure Future

Title: Comparative studies on survival and growth performance among diploid, triploid and tetraploid dojo loach (*Misgurnus anguillicaudatus*)

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Abstract: To determine the cytotype with better traits for the aquaculture practices of the dojo loach (*Misgurnus anguillicaudatus*) from the viewpoint of fish farming improvement, factorial crosses ($2n_{\text{♀}} \times 2n_{\text{♂}}$, $2n_{\text{♀}} \times 4n_{\text{♂}}$, $4n_{\text{♀}} \times 2n_{\text{♂}}$, $4n_{\text{♀}} \times 4n_{\text{♂}}$) were conducted between natural diploids (D) and tetraploids (T), producing DD, DT, TD, and TT groups (female listed first). The potential benefits of the different cytotypes in culture were evaluated by comparing growth performance and survival rate for a 15-month rearing trial under the same production conditions. The average fertilization rate in DT and TT was significantly lower than in the DD and TD groups, possibly indicating the poor fertilizing capacity of the tetraploid sires. Survival rate in DT and TD was slightly lower than in DD but significantly higher than in the TT groups. Tetraploid females produced obviously larger eggs than diploids and, subsequently, significantly longer initial body length of TT and TD than DD and DT fry. However, from the second month of the growth trial, TT suffered higher mortality than other cytotypes, which significantly influenced morphometric growth parameters. The TD group exhibited superior growth performance throughout the experiment. The mean body length of DT was comparable with that of DD fish during the first 7 months but began to outgrow DD from the 9th month. This study suggests that the relatively better growth of tetraploid and higher survival rate of diploid can be integrated via inter-ploidy hybridization to get TD triploids with better culture traits.

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