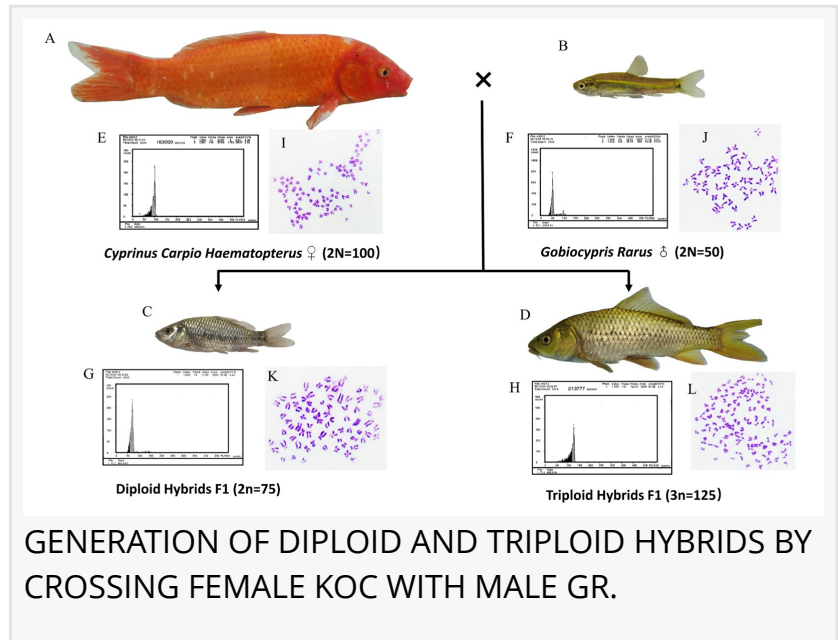


Comparison of diploid and triploid hybrid fish from the same parents

USA, March 12, 2024

[/EINPresswire.com/](https://www.einpresswire.com/) -- The researchers carried out a hybridization experiment between female koi carp and male Chinese rare minnow, eventually obtaining allodiploid and allotriploid hybrid offspring. They made a systemic comparison between them and found that the triploid hybrids showed faster growth, higher expression of growth-promoting genes and lower expression of growth-inhibiting genes than the diploid hybrids. This study provides implications to explain the faster growth of polyploid fish.



The determination of animal growth rate and body size is an interesting scientific issue, and understanding the molecular mechanisms involved can guide agricultural production for genetic breeding. However, differences in the genetic background across species have led to slow progress in related research.

In a recent study (<https://doi.org/10.1016/j.repbre.2023.12.005>) published in the KeAi journal *Reproduction and Breeding*, a team of researchers from China produced new [germplasm](#) resources through distant hybridization to explore the determination of growth rate and body size in fish.

Distant hybridization refers to crosses between two different species, genera or higher taxa. The production of hybrid progeny is important for the enrichment of germplasm resources. In the study, Koi carp and Chinese rare minnow were selected as parents for the hybridization experiment. These two parent species belong to different subfamilies within the Cyprinidae family and showed significant differences in growth rate, body size, reproductive cycle and spawning behavior.

"The hybrid offspring can combine the biological characteristics and genome of both parents,

which enables the matching of phenotypes and genotypes," explains co-corresponding author Yuqin Shu, a researcher at the State Key Laboratory of Developmental Biology of Freshwater Fish at Hunan Normal University.

The obtained progenies were classified as allodiploid and allotriploid based on their DNA content, chromosome numbers. The comparison between the two kinds of hybrid progenies and their parents on countable traits, measurable traits, erythrocyte morphology, karyogene composition and mitochondrial gene composition demonstrate the appearance of the hybrids were between the parents.

"We also found the triploid hybrids showed faster growth rate and larger body size than the diploid hybrids under the same conditions," adds Shu. "The two kinds of hybrid offspring showing similar genetic background but distinct growth rate making them ideal subjects for investigations into growth traits."

To investigate the reason for the difference in growth rate between the diploid and triploid hybrids, the expression of growth-related genes was analyzed between them. The researchers found that the growth-promoting genes, such as *gh1* and *igf1*, were highly expressed in the triploid hybrids, while the opposite was true for the suppressor genes. These results partly explain the faster growth of triploid hybrids.

"A crucial aspect of our future research will involve an in-depth analysis of the underlying mechanism governing the gene expression patterns in diploid and triploid hybrids" says Shu.

DOI

10.1016/j.repbre.2023.12.005

Original Source URL

<https://doi.org/10.1016/j.repbre.2023.12.005>

Funding information

This work was supported by the National Natural Science Foundation of China (32293251, 31802291), the Natural Science Foundation of Hunan Province (2021JJ40342, 2021JJ40343), and the Hunan province college students research learning and innovative experiment project (S202210542154).

Lucy Wang

BioDesign Research

[email us here](#)

This press release can be viewed online at: <https://www.einpresswire.com/article/695271235>

EIN Presswire's priority is source transparency. We do not allow opaque clients, and our editors try to be careful about weeding out false and misleading content. As a user, if you see something

we have missed, please do bring it to our attention. Your help is welcome. EIN Presswire, Everyone's Internet News Presswire™, tries to define some of the boundaries that are reasonable in today's world. Please see our Editorial Guidelines for more information.

© 1995-2024 Newsmatics Inc. All Right Reserved.