

Whole genome duplications linked to higher oil yields in key crops

September 3 2024



Credit: Pixabay/CC0 Public Domain

Oil crops are pivotal for human nutrition and industry due to their ability to produce and store large amounts of oil in seeds. With the global demand for vegetable oils steadily rising, there is an urgent need to

discover new high-yielding oil plants and improve the oil production of existing crops. Addressing these challenges requires a deep understanding of the genetic mechanisms behind oil biosynthesis.

On June 7, 2024, researchers from Lanzhou University, Shanxi Normal University, and other institutions [published](#) their findings in *Horticulture Research*. They explored the role of whole genome duplications (WGDs) in oil biosynthesis across various oil [crops](#) by analyzing the genome of *Elaeagnus mollis*. The study provides key insights into how WGDs drive the evolution of oil biosynthetic genes, significantly enhancing oil crop performance.

The team assembled a comprehensive genome of *Elaeagnus mollis*, revealing two ancient WGD events that expanded the genetic toolkit for oil biosynthesis. Remarkably, 74% of the genes involved in [oil production](#) were found to be WGD-derived duplicates. This pattern was consistent across other major oil crops like rapeseed and sunflower, highlighting the crucial role of WGDs in oil [biosynthetic pathways](#).

In contrast, non-oil plants showed limited contributions from WGDs, relying more on other gene duplication methods. The findings underscore the unique evolutionary edge WGDs give oil crops, promoting higher oil content and specialized pathways that support their adaptation and productivity.

"WGDs are critical drivers of genetic diversity and innovation, particularly in oil biosynthesis," said Dr. Shengdan Wu, a senior author of the study.

"Our research demonstrates how these duplications have repeatedly shaped oil biosynthetic pathways in various crops, opening up new possibilities for breeding and crop improvement strategies to enhance oil yields."

These findings offer valuable insights into the genetic evolution of oil crops, highlighting WGDs as key factors in enhancing oil biosynthesis. This knowledge can guide future breeding programs aimed at increasing oil content, helping meet the growing global demand for [vegetable oils](#).

Moreover, understanding these genetic processes can support efforts to improve crop resilience and adaptability in the face of evolving agricultural challenges.

More information: Jingjing Wu et al, The evolutionary significance of whole genome duplications in oil biosynthesis of oil crops, *Horticulture Research* (2024). [DOI: 10.1093/hr/uhae156](https://doi.org/10.1093/hr/uhae156)

Provided by Lanzhou University

Citation: Whole genome duplications linked to higher oil yields in key crops (2024, September 3) retrieved 3 September 2024 from <https://phys.org/news/2024-09-genome-duplications-linked-higher-oil.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--