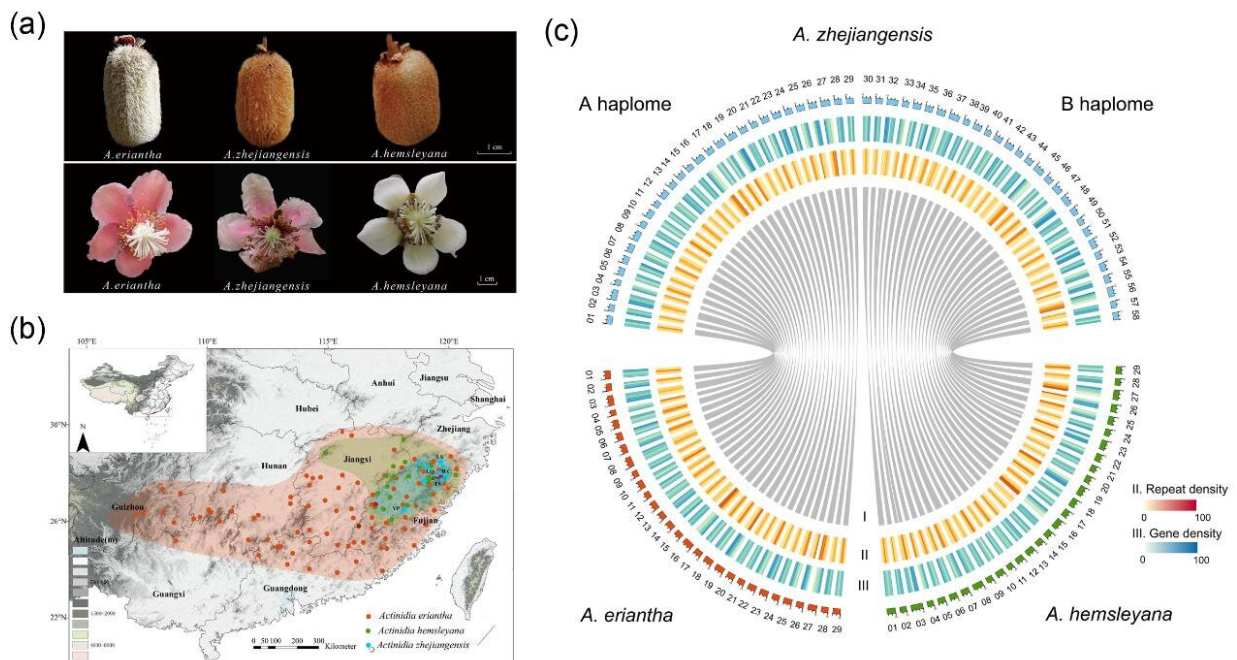


Genomic analysis reveals dead-end hybridization between kiwifruit species

June 28 2023, by Zhang Nannan



Morphological characteristics, genome features and geographic distribution of *A. zhejiangensis*, *A. hemsleyana* and *A. eriantha*. (a) Morphological characteristics for fruits and female flowers of *A. zhejiangensis*, *A. hemsleyana* and *A. eriantha*. (b) Circos plot of the *A. zhejiangensis*, *A. hemsleyana* and *A. eriantha* genomes. Credit: Yu Xiaofen

Compared to allopolyploid speciation, there are fewer cases of homoploid hybrid speciation in plants. Although transient homoploid

hybridization events have been detected in many plant genera, solid evidence from genomic data is scarce.

The reticulate evolution caused by interspecific hybridization has greatly contributed to speciation of *Actinidia*. *Actinidia zhejiangensis*, a [species](#) published in 1982, is distributed in Jiangxi, Zhejiang and Fujian Province in China with a small population size.

Previous studies speculated that *A. zhejiangensis* originated from hybridization between *Actinidia eriantha* and *Actinidia hemsleyana* or *Actinidia rufa* based on limited molecular markers and small number of sampled taxa. The hybridization origin of *A. zhejiangensis*, and the phylogenetic relationship between it and other *Actinidia* species still cannot be determined from the [morphological characteristics](#) and the reported molecular evidence.

Researchers from the Wuhan Botanical Garden of the Chinese Academy of Sciences, together with collaborators from Lushan Botanical Garden and Forest Resources Monitoring Center of Zhejiang Province, generated chromosome-scale reference genome assemblies of *A. zhejiangensis* and *A. hemsleyana* to reveal the transient homoploid hybridization of *A. zhejiangensis*.

Results were published in *The Plant Journal*, titled "Genomic analyses reveal dead-end hybridization between two deeply divergent kiwifruit species rather than homoploid hybrid speciation."

The chromosomes of *A. zhejiangensis* were confidently assigned to two sets of haplotypes. Combined with a published *A. eriantha* genome, the researchers found these two haplotypes originated from *A. eriantha* and *A. hemsleyana*, respectively. Based on resequencing data from *A. zhejiangensis*, *A. eriantha*, and *A. hemsleyana* individuals, they discovered that *A. zhejiangensis* were mainly F1 hybrids of *A.*

hemsleyana and *A. eriantha*, and *A. hemsleyana* and *A. eriantha* were the constant paternal and maternal parents, respectively.

Thus, *A. zhejiangensis* was not a stabilized independent hybrid species, although [gene flow](#) started about 0.98 million years ago, suggesting strong reproductive barriers between *A. hemsleyana* and *A. eriantha*.

Five inversions containing genes involved in pollen germination and pollen tube growth could affect the fertility of hybrids between *A. hemsleyana* and *A. eriantha*. Despite its distinct morphological traits and long recurrent hybrid origination, *A. zhejiangensis* did not initiate speciation.

This study provides the first evidence of dead-end [hybridization](#) between two deeply divergent kiwifruit species rather than homoploid hybrid speciation, sheds light on Acitnida [speciation](#), and generates valuable genomic resources for future evolutionary and functional genomics studies of kiwifruit.

More information: Xiaofen Yu et al, Genomic analyses reveal dead-end hybridization between two deeply divergent kiwifruit species rather than homoploid hybrid speciation, *The Plant Journal* (2023). [DOI: 10.1111/tpj.16336](https://doi.org/10.1111/tpj.16336)

Provided by Chinese Academy of Sciences

Citation: Genomic analysis reveals dead-end hybridization between kiwifruit species (2023, June 28) retrieved 28 April 2024 from <https://phys.org/news/2023-06-genomic-analysis-reveals-dead-end-hybridization.html>

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.