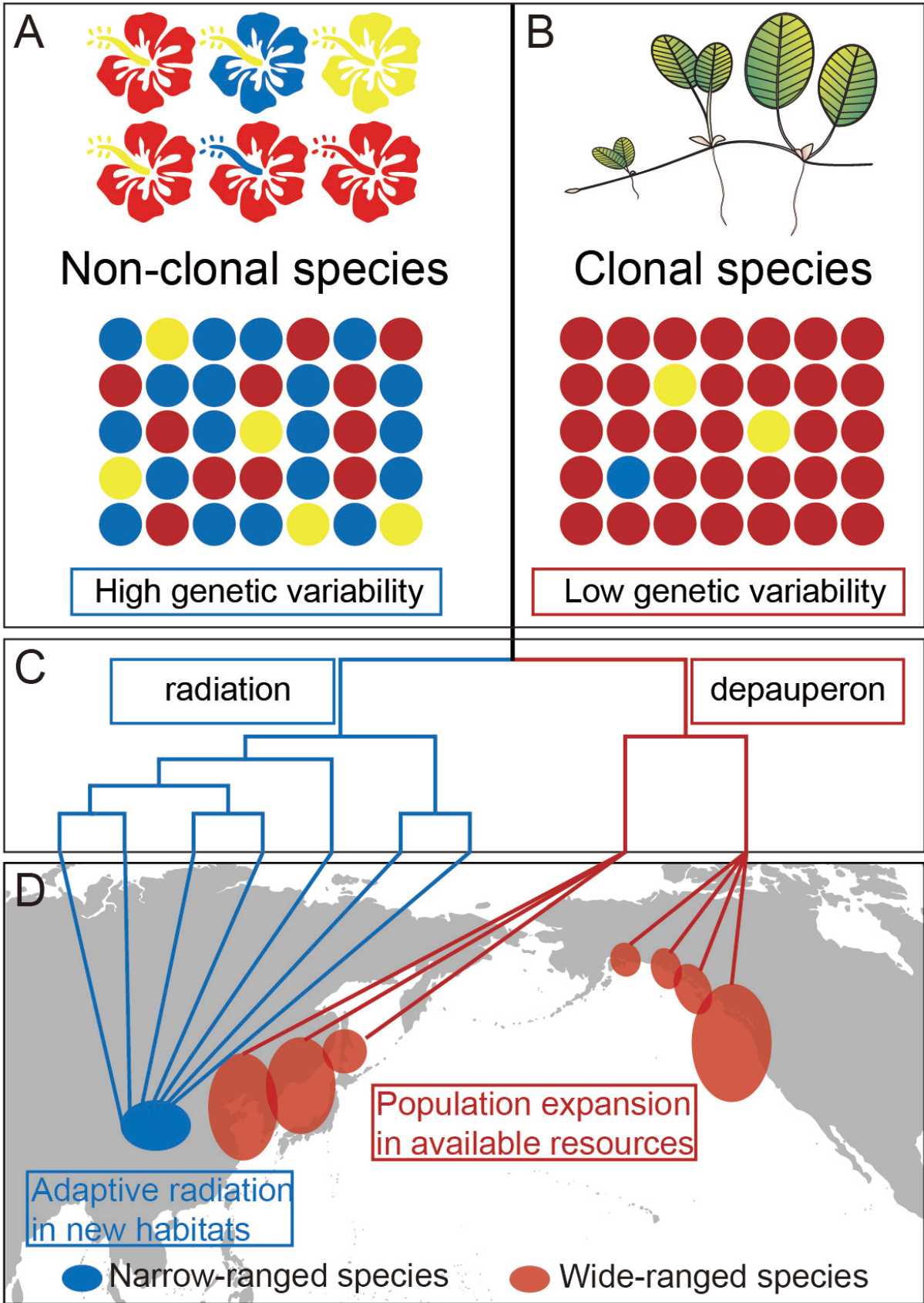


Plant lineage study provides insights into the ecological and evolutionary effects of different reproductive strategies

September 27 2024



Simplified schematic of the ecological and evolutionary effects associated with the shifts in reproductive strategies of plant lineages. Credit: Science China Press

Hang Sun's group from Kunming Institute of Botany, Chinese Academy of Sciences has demonstrated the ecological and evolutionary effects of changes in plant reproductive strategies on phylogenetic evolution. The study is [published](#) in the journal *Science China Life Sciences*.

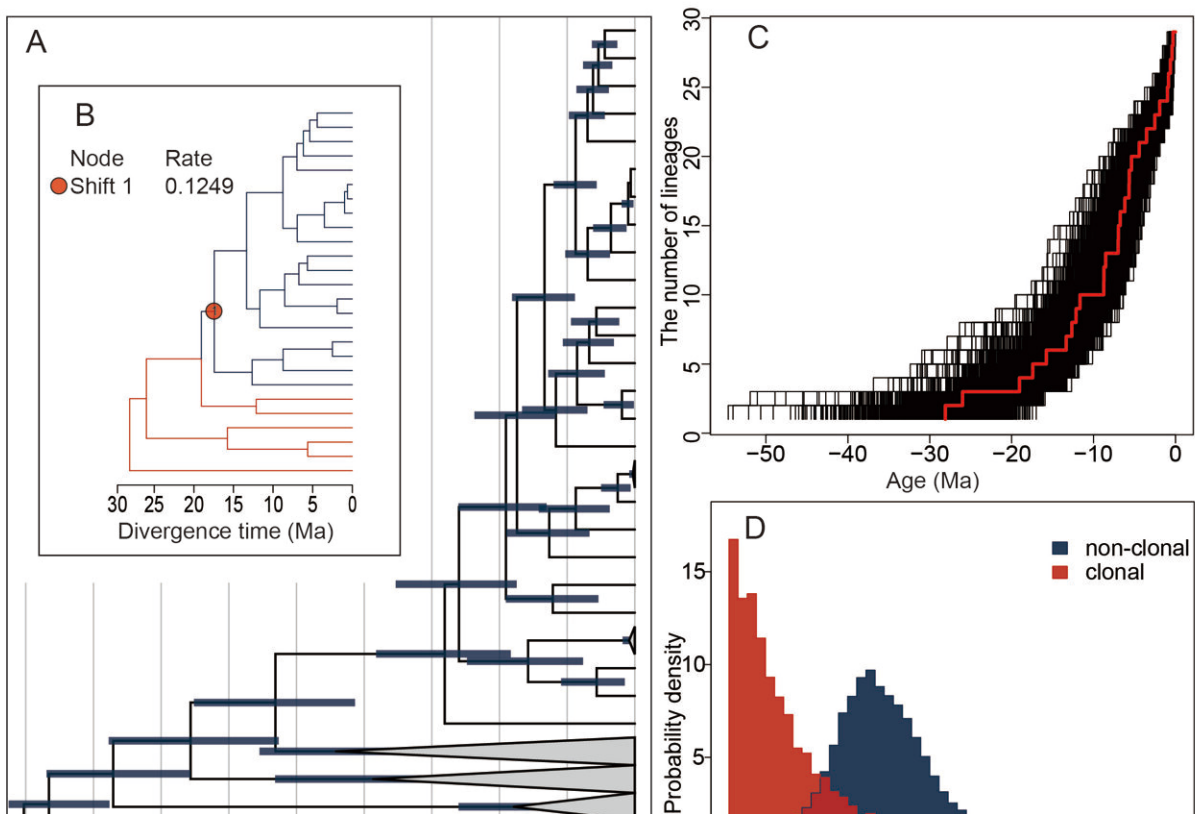
Reproduction is a key process in life history, and the maintenance and shift of reproductive strategies and the associated cost-benefit balance have long intrigued scientists. It is argued that different reproductive strategies may affect [genetic diversity](#) and diversification patterns, but the ecological and evolutionary effects of changes in reproductive strategy need to be further explored.

The research team selected Irregulares+Heterisia, the earliest lineage of Saxifraga to diverge, as the focus clade. Multiple sets of sequencing data including DNA fragments, chloroplast genomes, and low-copy nuclear gene datasets were used to reconstruct the phylogenetic relationships of this clade.

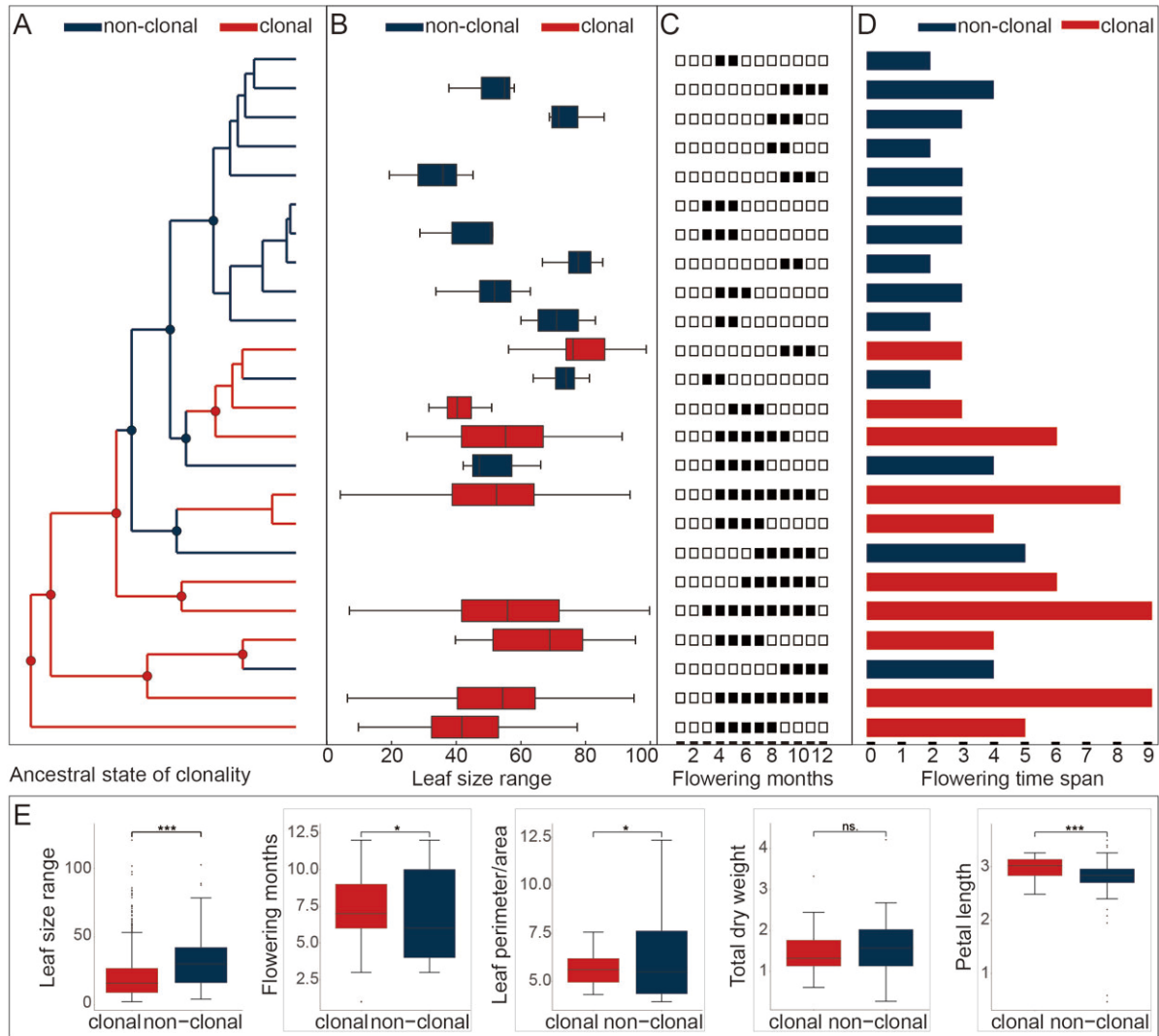
The evolutionary history of this clade was reconstructed through divergence time estimation, ancestral trait reconstruction, and diversification rate assessment. The results indicate a progressive absence of clonality in this plant lineage. Compared with the early-diverged clonal species, recently diverged non-clonal species have higher morphological and genetic diversity, and differentiation rates.

The research team further compared the differences in niche and

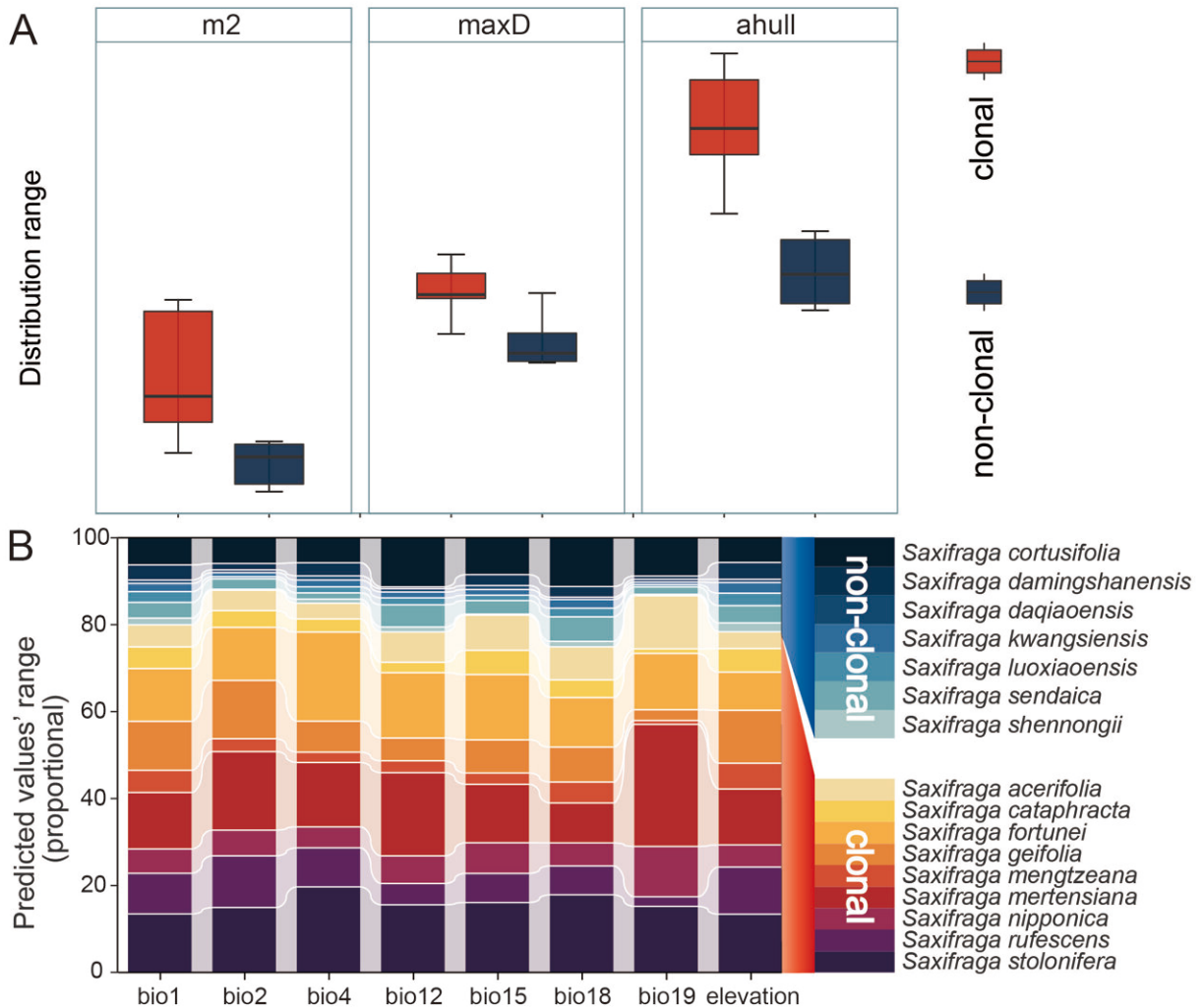
distribution range between clonal species and non-clonal species based on the georeferenced localities of each species in this clade. Ecological niche modeling (ENM) was conducted to estimate and compare the occurrence probability of clonal and non-clonal species under different climate conditions. Clonal species have significantly larger distribution ranges and ecological niches in comparison with non-clonal species.



Diversification dynamics of Irregulares+Heterisia. Credit: Science China Press



Morphological and phenological differentiations of Irregulares+Heterisia with different reproductive strategies. Credit: Science China Press



Distribution range and environmental niche space of Irregulares+Heterisia.
Credit: Science China Press

This case study indicates the ecological and evolutionary effects associated with the shifts in [reproductive strategies](#) of plant lineages. In addition, the research team argue that clonality should be regarded as a [life history](#) strategy for species to survive under different environmental conditions, rather than a dead end.

More information: Xin-Jian Zhang et al, Shifts in reproductive strategies in the evolutionary trajectory of plant lineages, *Science China Life Sciences* (2024). [DOI: 10.1007/s11427-024-2597-9](https://doi.org/10.1007/s11427-024-2597-9)

Provided by Science China Press

Citation: Plant lineage study provides insights into the ecological and evolutionary effects of different reproductive strategies (2024, September 27) retrieved 7 February 2025 from <https://phys.org/news/2024-09-lineage-insights-ecological-evolutionary-effects.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.