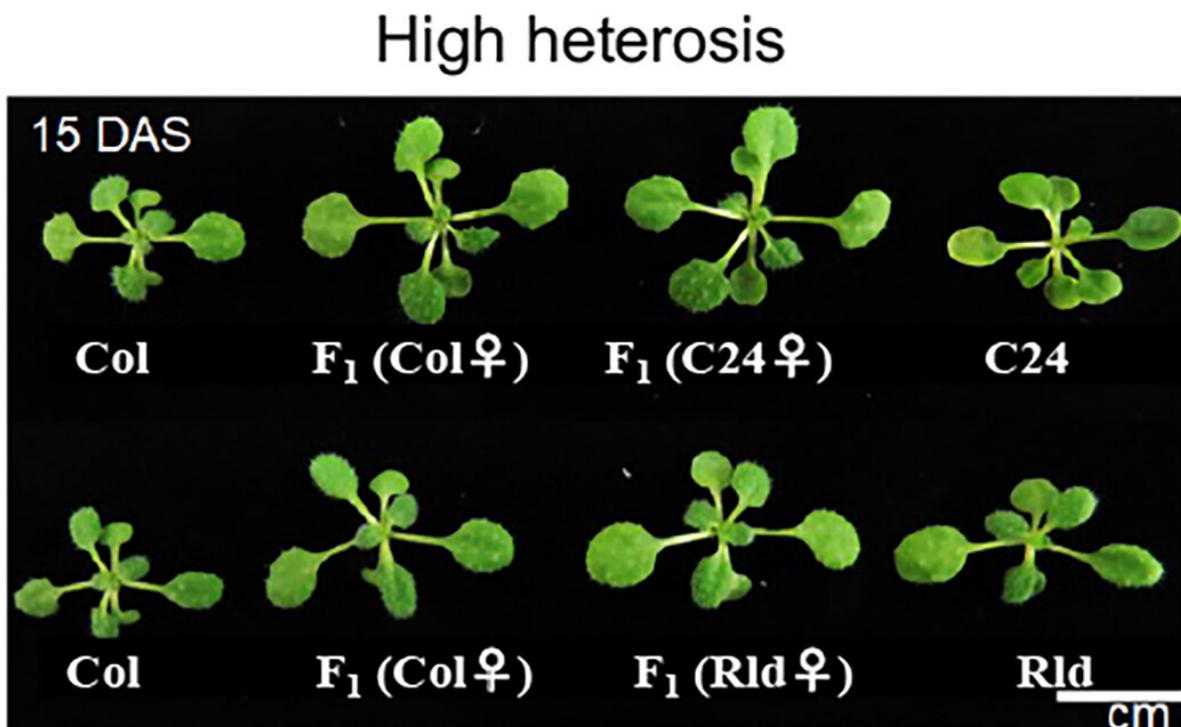


Increase in biomass due to changes in F1-hybrid metabolite

June 30 2023



The phenotype of representative hybrids with different levels of fresh weight heterosis. Credit: University of Tsukuba

Heterosis is a phenomenon in which F₁ hybrids, generated by crossing different species or strains, exhibit more vigorous growth than their parents. F₁ hybrids are grown for many crops on the market today.

However, although heterosis has been known for more than 100 years, its mechanism has not yet been completely understood.

In a study recently published in the journal *Scientific Reports*, researchers used a total of 202 Arabidopsis lines as model [plants](#). The plants were grouped according to the level of heterosis on the basis of the phenotypic analysis of flowering time, seed size, seed germination time, and 15-day postgermination fresh weight.

The comparative analysis of heterosis expression levels between high- and low-heterosis combinations revealed that the production of intermediate metabolites of the TCA cycle ([carbon](#) metabolic circuit in [mitochondria](#)) was specifically altered in heterosis combinations that exhibited high levels of heterosis.

The researchers believe that understanding the molecular mechanisms of heterosis might contribute to the efficient development of F₁ breeding methods and high-biomass crops.

More information: Quynh Thi Ngoc Le et al, Morphological and metabolomics profiling of intraspecific Arabidopsis hybrids in relation to biomass heterosis, *Scientific Reports* (2023). [DOI: 10.1038/s41598-023-36618-y](#)

Provided by University of Tsukuba

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