

Grain size discovery boosts sorghum potential

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Dr Youngfu Tao displays grain size variations in sorghum. Credit: Megan Pope, University of Queensland

Researchers at The University of Queensland are optimistic that the value and versatility of one of the world's top crops will be improved following the discovery of genes which could increase the grain size of

sorghum.

Use of the drought-resilient summer crop has been constrained by the small size of sorghum grains, but Professor David Jordan from the Queensland Alliance for Agriculture and Food Innovation said that could be about to change.

"Sorghum is Australia's third-largest grain crop, providing vital feed to animals, but it is increasingly being used in cereals and other foods for human consumption," he said.

"Sorghum has been an important dietary source of starch in Africa for thousands of years, but it is increasingly valued in Western diets as a low-GI, gluten-free and nutritious grain.

"Larger [grains](#) make it more digestible for both people and animals and improves processing efficiency."

Sorghum is popular among Australian growers, particularly in Queensland and New South Wales, and the research will help breeders to expand the crop's potential.

The project began six years ago, involving UQ and the Queensland Department of Agriculture and Fisheries.

QAAFI Research Fellow Dr. Yongfu Tao initially mapped the sorghum genome to help identify which genes were associated with grain size, narrowing the search with existing [genetic information](#) for rice and maize.

"New variants have been identified that are capable of doubling grain weight," Dr. Tao said.

"These traits are strongly inherited, with genes accounting for as much as 80 percent of the grain size characteristics.

Dr. Tao said 125 regions in the sorghum genome had now been identified where variation in the DNA sequence was associated with grain size and response to environmental conditions.

The analyses included wild relatives of domesticated sorghum and Australian native sorghum.

"We demonstrated that [genetic diversity](#) exists in the sorghum gene pool for grain size," he said.

"Genetic makeup largely determined an individual sorghum plant's grain size, however environmental conditions also had an effect.

"This allows us to identify the genetic control of [grain size](#) with minimal change to environmental resources, such as water or nitrogen."

The project also delivered additional information and tools to help plant breeders improve sorghum cultivars.

The research is published in *The Plant Journal*.

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More information: Yongfu Tao et al, Manipulating assimilate availability provides insight into the genes controlling grain size in sorghum, *The Plant Journal* (2021). [DOI: 10.1111/tpj.15437](https://doi.org/10.1111/tpj.15437)

Provided by University of Queensland

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