# A genetic treasure hunting in sorghum may benefit crop improvement

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A consortium of researchers from The University of Queensland, the Queensland Department of Agriculture, Fisheries and Forestry (DAFF Qld) and BGI has discovered that sorghum, a drought-tolerant African crop, holds vastly more genetic variation than previously reported. This study published in *Nature Communications* today provides an invaluable resource for the genetic improvement of sorghum and other grass species.

Sorghum is not only a food and feed cereal crop, but also can be used as the basis of biofuel. Its resistance to heat and water stress allows it to grow in poor dryland regions as a staple food resource for 500 million poor people in Africa and Asia, alleviating both poverty and hunger. Sorghum is in the same family as rice (*Oryza sativa*), wheat (*Triticum aestivumLinn*) and maize (*Zea mays*), and it is expected to play an increasingly important role in feeding the world's growing population. Furthermore, sorghum's special features such as a small diploid genome and phenotypic diversity make it an ideal C4 grass model.

By conducting whole-genome sequencing, the team obtained the genomic data of 44 sorghum lines to represent all major races of cultivated grain sorghum (*Sorghum bicolor*) in addition to its progenitors and the allopatric Asian species, *S. propinquum*. The analysis indicated that sorghum possesses a diverse primary gene pool but with decreased diversity in both landrace and improved groups. In addition to *S. bicolor*, a great untapped pool of diversity also exists in *S. propinquum*, and the first resequenced genome of *S. propinquum* was presented.

The researchers' analyses revealed that sorghum has a strong racial structure and a complex domestication history involving at least two distinct domestication events. More importantly, they found that modern cultivated sorghum was derived from a limited sample of racial variation. The study identified 8M high-quality SNPs, 1.9M indels and specific gene loss and gain events in *S. bicolor*, providing the largest dataset obtained in sorghum to date.

"Crop domestication and genetic improvement are the key points for breeding research. Our joint efforts yield an invaluable genetic resource for researchers to explore sorghum evolution and its genetic improvement." said Shuaishuai Tai, Project Manager from BGI, "BGI is making continuous efforts for the advancement of agricultural research. This is another significant breakthrough made by BGI on population genomics research after rice, soybean and maize."

Provided by BGI Shenzhen

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