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**Identification of a stem length regulator in sorghum**

Sorghum *Dw2* encodes a protein kinase regulator of stem internode length, a key factor in biomass yield.

**The Science**

Stem length is a key trait for various sorghum genotypes, impacting biomass yield, plant architecture, and other important crop features. In this study, we identified the gene encoded by *Dw2*, a locus known to affect stem internode length; this gene encodes a protein kinase homologous to a member of the AGC protein kinase family in the plant Arabidopsis.

**The Impact**

In energy sorghum, 83% of the shoot biomass accumulates in the stem. Increasing our knowledge of stem growth could help us to improve sorghum hybrids for bioenergy production.

**Summary**

Sorghum is an important C4 grass crop grown for grain, forage, sugar, and bioenergy production. While tall, late flowering landraces are commonly grown in Africa, short early flowering varieties were selected in US grain sorghum breeding programs to reduce lodging and to facilitate machine harvesting. Four loci have been identified that affect stem length (*Dw1*-*Dw4*). Subsequent research showed that *Dw3* encodes an ABCB1 auxin transporter and *Dw1* encodes a highly conserved protein involved in the regulation of cell proliferation. In this study, *Dw2* was identified by fine-mapping and further confirmed by sequencing the *Dw2* alleles in Dwarf Yellow Milo and Double Dwarf Yellow Milo, the progenitor genotypes where the recessive allele of *dw2* originated. The *Dw2* locus was determined to correspond to Sobic.006G067700, a gene that encodes a protein kinase that is homologous to KIPK, a member of the AGCVIII subgroup of the AGC protein kinase family in Arabidopsis. In addition to its historical significance, a better understanding of *Dw2* function may enable the design of improved sorghum crops.

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**Publications**

Hilley, J.L. *et al.* Sorghum *Dw2* encodes a protein kinase regulator of stem internode length**.** *Scientific Reports* **7**, 4616 (2017) [DOI:10.1038/s41598-017-04609-5].

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