Hybrid plants found better than its parents by genetics study

An Iowa State University agronomist has helped uncover the genetic mechanisms in sorghum plants that allow hybrids to perform better than parent varieties, a process known as heterosis. The author stated that the new study fills in some of the gaps that have nagged scientists for years and could lead to more precision in plant breeding,

Heterosis accounts for why a sorghum hybrid may grow taller than either of its parent varieties.

The precise genetics that drive heterosis are only partially understood till now, hence the researchers worked with colleagues at Kansas State University to pin down how heterosis works regarding plant height in sorghum plants. The research was published recently in the peer-reviewed Proceedings of the National Academy of Sciences (October, 2015). Since the mechanisms behind heterosis was not understood clearly for a long time, the researchers have tried to show specifically what is happening with plant height in sorghum which illustrates the theory.

The study focused on repulsion phase linkage, or the link between a dominant allele of one gene with the recessive allele of another gene. The dominant alleles are responsible for the higher expression of hereditary traits. Studying repulsion phase linkage in sorghum explains how a hybrid plant can be taller than either of the parent varieties.

The researchers explained the reason behind this as the genes of inbred plants or plants produced from the same parent variety sometimes cancel each other out. Combining the right varieties means those genes are no longer canceling each other out, unleashing the potential for desirable traits to manifest in the hybrid

The main author also said that multiple genes govern a sorghum plant's total height. For instance, some genes may only influence the base of the plant, while other genes affect the entire plant. Untangling all those connections also points to how hybrids may outperform both parent varieties. A better understanding of heterosis could pave the way for faster and more focused advances in developing varieties for a range of crops.

Journal Reference:

Xin Li, Xianran Li, Eyal Fridman, Tesfaye T. Tesso, Jianming Yu. **Dissecting repulsion linkage in the dwarfing geneDw3region for sorghum plant height provides insights into heterosis.** *Proceedings of the National Academy of Sciences*, 2015; 112 (38): 11823 DOI:10.1073/pnas.1509229112