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Breadfruit (*Artocarpus altilis*) gibberellin metabolic genes: stem elongation and abiotic stress response

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Breadfruit (*Artocarpus altilis*) is a traditional staple tree crop in the Oceania. Susceptibility to tropical windstorm damage has driven an interest in developing breadfruit with dwarf stature. Gibberellin (GA) is one of the most important determinants of plant height. As a first step toward understanding the molecular mechanism of growth regulation in the species, we investigated the role of GA and the regulation of *GA20*-oxidase and *GA2*-oxidase genes in breadfruit. We provided first evidence that the stem elongation in breadfruit could be manipulated by exogenous gibberellin-related growth regulators. We then cloned six *GA20*-oxidase *cDNAs, AaGA20ox1- AaGA20ox6*, and four *GA2*-oxidase *cDNAs, AaGA2ox1- AaGA2ox4* in full-length from breadfruit. *AaGA20ox1, AaGA20ox3* and *AaGA20ox4* were predominantly expressed in green vegetative organs, but displayed different expression pattern in roots and reproductive organs. *AaGA20ox2, AaGA20ox5* and *AaGA20ox6* were expressed mainly in leaves at low level. On the other hand, transcripts of *AaGA2ox1, AaGA2ox2* and *AaGA2ox3* were detected in all plant organs, but exhibited highest level in source leaves and stems. In contrast, transcript of *AaGA2ox4* was predominantly expressed in roots and flowers, and displayed very low expression in leaves and stems. *AaGA20ox1, AaGA20ox3 - AaGA20ox6* and *AaGA2ox1 - AaGA2ox3*, were subjected to GA feedback regulation following treatment of exogenous gibberellin and/or gibberellin biosynthesis inhibitors. Members of *AaGA20oxs* and *AsGA2oxs* were also regulated under drought and salinity stress. The function of these genes is discussed with reference to their role in stem elongation and the opportunities of breadfruit dwarfing.

Biography

Yuchan Zhou is a Plant Scientist with interest in the genetic and environmental control of plant development. Her current research focus is to improve climate resilience of tropical tree crops through a better understanding of the diversity and molecular basis of tree architecture. Her other research area includes functional genomics of nutrient accumulation in developing fruits and seeds, the biology and management of post-harvest food loss and stress tolerance.

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