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Exploring key cellular processes and candidate genes regulating the primary thickening growth of Moso underground shoots

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The primary thickening growth of Moso (*Phyllostachys edulis*) underground shoots largely determines the culm circumference. However, its developmental mechanisms remain largely unknown. Using an integrated anatomy, mathematics and genomics approach, we systematically studied cellular and molecular mechanisms underlying the growth of Moso underground shoots. We discovered that the growth displayed a spiral pattern and pith played an important role in promoting the primary thickening process of Moso underground shoots and driving the evolution of culms with different sizes among different bamboo species. Different with model plants, the shoot apical meristem (SAM) of Moso is composed of six layers of cells. Comparative transcriptome analysis identified a large number of genes related to the vascular tissue formation that were significantly unregulated in a thick wall variant with narrow pith cavity, mildly spiral growth, and flat and enlarged SAM, including those related to plant hormones and those involved in cell wall development. These results provide a systematic perspective on the primary thickening growth of Moso underground shoots, and support a plausible mechanism resulting in the narrow pith cavity, weak spiral growth but increased vascular bundle of the thick wall Moso.

Biography

Qiang Wei employs a combination of anatomy, mathematics, genomics, genetic, biochemical and other approaches to disclose the molecular mechanisms underlying the distinguished developmental process of bamboo with special interests in the development of bamboo wood.

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