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**What roots and shoots have in common: toward an understanding of the mechanisms that establish plant architecture**

The positioning of lateral root primordia along the main root axis varies widely in response to environmental cues and is an important component of overall plant architecture, yet the mechanisms that result in this patterning are not fully understood. This talk will explore a current controversy as to how lateral root spacing is established and will provide evidence that lateral root spacing is controlled by three members of the*PLETHORA* transcription factor family; a gene family that was originally described based on its involvement in stem cell maintenance. Although the architecture of root and shoot systems are quite different, these same three genes have been shown to regulate positioning of leaf primordia, raising questions about the extent of similarity between the systems that pattern the root and shoot.