

PREMATURE INTERNODE ELONGATION 1 (PINE1) REPRESSES GIBBERELLIN SENSITIVITY IN THE RICE STEM

VICENTINI G.*, BIGNARDI A.*, MOORE S.**, CAZZANIGA F.*, PIROTA M.*,
GIAUME F.*, GOMEZ-ARIZA J.*, PIERCE S.*, FORNARA F.*, BRAMBILLA V.*

*) Dipartimento di Scienze Agrarie e Ambientali, Università degli Studi di Milano

**) Dipartimento di Bioscienze, Università degli Studi di Milano

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The rice stem elongates thanks to the activity of intercalary meristems that lay at the base of each node. When the rice plant grows vegetatively, the nodes are compressed at the base of the stem but during flowering the intercalary meristems are activated to support internode elongation that leads to heading of the panicle. The same process occurs in deep water rice varieties where internodes elongate in response to submergence to allow rapid plant growth to reach the air and survive flooding.

We recently isolated the *PREMATURE INTERNODE ELONGATION 1 (PINE1)* gene that is required to repress internode elongation during vegetative development and that it is downregulated during floral induction to allow stem growth (Gomez-Ariza et al., Nature Plants 2019). The same gene was independently cloned from deep water rice varieties and named *DECELERATOR OF INTERNODE ELONGATION 1 (DEC1)* as it allows internode elongation in deep water varieties under water submergence (Nagai et al., Nature 2020).

Functional characterization of PINE1/DEC1 showed that it is a zinc finger transcription factor that reduces the sensitivity of the stem to GIBBERELLIN (GA) by repressing the transcription of target genes via the induction of modifications in chromatin conformation. We are currently investigating the mechanisms by which PINE1/DEC1 performs its molecular activity and which are its target genes that allow repression of GA sensitivity of the stem. Finally, we are exploiting this novel GA-related pathway to modulate plant growth and architecture for rice breeding purposes.