

Research Highlights

Seed germination regulators: all in the timing

The timing of seed germination is crucial for optimising harvests. Pre-harvest sprouting is prevented when seeds enter a dormant state, but a high level of dormancy has economic repercussions. Now, using RNA and sequence analysis and comparisons with other plants, researchers at Okayama University have unravelled some of the mechanisms regulating seed maturation and dormancy in wheat.

Studies of arabidopsis - a small flowering plant related to cabbage and mustard – have identified transcription factors that regulate its seed maturation and dormancy. However few studies have yet investigated seed maturation regulators in wheat, or monocots in general. Monocots – plants with one seed leaf as opposed to dicots, which have two – include rice, wheat, maize, sugar cane, pasture grass and bamboo, so they are particularly economically significant.

Kazuhide Rikiishi and Masahiko Maekawa grew seedlings of nine varieties of wheat. They harvested the seeds every 10 days until 60 days after pollination, and incubated the seeds on petri dishes. They then counted the number of seeds on each petri dish each day to monitor germination, and analysed the RNA of samples at different stages after pollination.

The researchers found genes specific to certain tissues and stages of development that were similar to the seed maturation regulators reported for Arabidopsis. They also showed how these genes affect seed dormancy in wheat and the pathways for regulating seed dormancy.

Cereal seeds with low dormancy are now used regularly to boost production and pre-harvest sprouting has become an increasingly troubling issue. The authors conclude in their report, “The regulatory networks of seed maturation might be conserved for the control of seed dormancy in dicot and monocot species.”

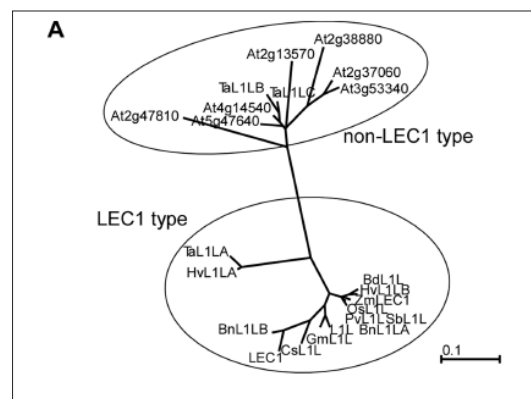


Figure caption: Unrooted phylogenetic (or evolutionary) tree showing the relationships between species. Trees were constructed from the deduced amino acid sequences of the domains of the proteins LEC1 type (a regulator of seed maturation in Arabidopsis), non-LEC1 type and their orthologues - genes in other species sharing the same ancestry. Scale bars represent amino acid substitutions per site.

Publication and Affiliation

Kazuhide Rikiishi*, Masahiko Maekawa Seed maturation regulators are related to the control of seed dormancy in wheat (*Triticum aestivum* L.) *PLOS ONE*, 9, e107618. (2014).

Institute of Plant Science and Resources, Okayama University, Kurashiki, Okayama, Japan

*corresponding author, e-mail address: riki@drib.okayama-u.ac.jp

- Authors: Rikiishi Kazuhide, Maekawa Masahiko
- Title of original paper: Seed Maturation Regulators Are Related to the Control of Seed Dormancy in Wheat (*Triticum aestivum* L.)
- Journal, volume, pages and year: PLoS ONE 9(9), e107618 (2014).
<http://ousar.lib.okayama-u.ac.jp/metadata/52904>