

How do seeds prepare for their future?

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Seeds represent a crucial link between generations and enable plants to survive unfavourable conditions. Accurate timing of seed germination determines fitness in nature and yield in agriculture. Germination timing is controlled by dormancy, which is defined as the temporal inability of a viable seed to germinate under favourable conditions. In nature seeds select the best moment of the year to germinate but at the same time variation exists within seed batches to spread mortality risks. Seeds in agriculture should germinate immediately and uniformly after sowing.

Germination speed and dormancy are regulated both by intrinsic genetic factors and by environmental conditions during seed development and storage. Important environmental factors are temperature, light and nitrate, which give information about the time of the year and the vicinity of competing plants. Intrinsic factors are plant hormones and specific dormancy and germination genes. Abscisic acid inhibits germination and promotes dormancy whereas gibberellin has the opposite effect. Environmental factors act on intrinsic factors to influence germination.

In my talk I will give two examples of dormancy genes and their regulation by the environment. The gene *DELAY OF GERMINATION 1* has an essential role in dormancy in Arabidopsis. I will present how it controls germination by acting on the PP2C phosphatases of the abscisic acid signalling pathway. In the second example I will discuss a lettuce gene that influences germination at high temperatures.