Characterization of dormancy behaviour in seeds of the model legume Medicago truncatula

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Résumé en anglais	Seeds of Medicago truncatula, a genomic model species for legumes, exhibit physiological and physical dormancy. Here, the factors influencing the germination behaviour of freshly harvested and stored seeds were investigated using several genotypes. Hardseededness is promoted when mature seeds are equilibrated at relative humidities (RH) below 75%. The release of physical dormancy during imbibition was dependent on the initial water content/RH that the seeds were dried to: the drier the seeds, the longer the imbibition time needed to break physical dormancy. The kinetics of physical dormancy release was slower than that of physiological dormancy, making it possible to uncouple both phenomena. Freshly harvested embryos without seed coverings germinated at the same speed as afterripened seeds. The depth of dormancy varied between different M. truncatula genotypes, from more to less dormant: DZA315.16>A17 (Jemalong)>R108>DZA45.5. This difference was eliminated by removing the endosperm. Collectively, these observations indicate that the endosperm is likely the main factor in the reduced germination of freshly harvested seeds. White light decreased germination speed of dormant seeds whereas it had no effect on non-dormant seeds. Recently harvested seeds were most dormant at temperatures above 17°C, whereas afterripened seeds germinated over a wider range of temperature. Fluridone could efficiently break dormancy, reinforcing the role of abscisic acid (ABA) synthesis. However, dormancy was not affected by gibberellic acid (100 µM GA3) or nitrate. The particular dormancy features unravelled here for M. truncatula, combined with the available genomic resources, make it a new, useful model for genetic and molecular studies which can complement those developed for Arabidopsis.
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