region, containing this QTL, from the fast germinating parent in the reference background genome of the slow germinating parent. This now "Mendelised" QTL accounted for much of the difference in germination rate between the parent lines. We are currently investigating candidate genes from this QTL that may influence rate of germination. In addition, the Mendelised QTL has provided a new opportunity to investigate the physiological basis of this important seed vigour trait. This work will be reported and its potential use for improving and assessing seed vigour will be discussed.

Length of the lag period of germination and metabolic repair explain vigour differences in seed lots of maize (*Zea mays*)

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An alternative to the cold test for maize, based on mean just germination (JG) time, when the radicle first appears (MJGT) and mean germination (G) time, when the radicle reaches 2mm (MGT), has previously been significantly related to seed lot performance in soil. MJGT and MGT are the mean lag periods between the start of imbibition and germination for JG and G respectively. In the present work 10 commercial lots of maize were germinated in moist rolled towels at 20°C and observed every 6h for 6 days and the time when each seed reached JG and G noted. The MJGT and MGT, that is the lag periods, were significantly related to differences in vigour, measured as mean shoot length ($p< 0.001$) and variation in shoot length after 6 days. Hydrating seeds of four lots for 24h, followed by drying back, significantly reduced the lag period and increased shoot length. The lag periods of individual seeds within the 10 lots were significantly ($p< 0.001$) negatively correlated with shoot length, suggesting that the source of variation in shoot length was the timing of germination and the duration of the subsequent growth period to measurement. Evidence presented here and in the literature suggests that vigour differences between seed lots of maize result from deterioration, leading to longer lag periods to allow for metabolic repair in physiologically older seed, and that the delay in germination in lower vigour seeds reduces the time for seedling growth. The relevance of this hypothesis to seed vigour studies in general will be discussed.

Conductivity testing of Brassica seed lots: does seed moisture content affect results?

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In New Zealand, seed lots of *Brassica* spp. received for quality evaluation commonly have a seed moisture content (SMC) of between 6.0 to 8.0%. During conductivity testing, placing these relatively dry seeds directly into water may induce imbibition damage, thus increasing conductivity values. This hypothesis was tested by comparing conductivity results from *Brassica* seed lots at their original SMC (range from 6.0 to 7.6%) with those for the same seed lots for which SMC had been increased to 8.5% by slow moistening between paper towels. For 26 seed lots of *B. campestris*, *B. napus*, *B. napus* x *B. campestris*, *B. rapa* var *pekinensis* and *B. oleraceae* var. *alboglabra*, increasing the SMC to 8.5% before conductivity testing (4 replicates of 100 seeds/lot soaked in 50ml deionised water for 16h at 20 ±2°C reduced the variation among replicates of individual seed lots, and also reduced the conductivity values recorded. Tetrazolium testing of three seed lots of B. rapa demonstrated that slowly increasing SMC to 8.5% significantly reduced the percentage of non-viable seeds, suggesting that imbibition damage was occurring when dry seeds were placed directly into water. Field emergence of 26 *Brassica* seed lots was more strongly related to 16h conductivity test results after increasing SMC to 8.5% (r^2 from -0.59^{**} to -0.96^{**}) then to results when SMC was not adjusted prior to conductivity testing (r^2 from -0.48^{**} to -0.89^{**}).