

# Cereal seed quality after drought

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## Key Points

- Only use seed with high germination levels, ideally above 90%.
- Select seed from weed free paddocks.
- Select seed that has at least reached soft dough stage and where the majority of seed is likely to be wider than 2 mm.
- Grading of seed may improve germination but may not always be cost effective.
- Store this seed under cool dry conditions until January to allow the short term dormancy to break, then test for germination capacity using an accredited laboratory.
- Home germination tests can be unreliable and will not identify weak or slightly damaged seedlings.
- Resist sowing drought affected seed dry or too deep, and avoid seed fungicide or herbicide treatments that may reduce coleoptile length.

## Germination

Previous experience has shown that the impact of drought on germination is variable. Data from 2003 (Figure 1) shows the variation in the germination percentage of the screenings of drought affected crops.

The defining factor is the stage at which the crop ceased supplying nutrients to the grain. The developing seed needs to have reached soft-dough stage before filling ceased to be viable. If grain-fill stops at the soft-dough stage it will shrink considerably as it dries down. This will produce a significantly smaller endosperm with potentially reduced germination capacity and less seedling vigour.

The process is similar for pulses and oilseeds. Larger sized seeds are likely to have good germination. However, be very careful when harvesting and handling pulse seed as it is easily damaged by excessive handling, especially when the seed is over dry.

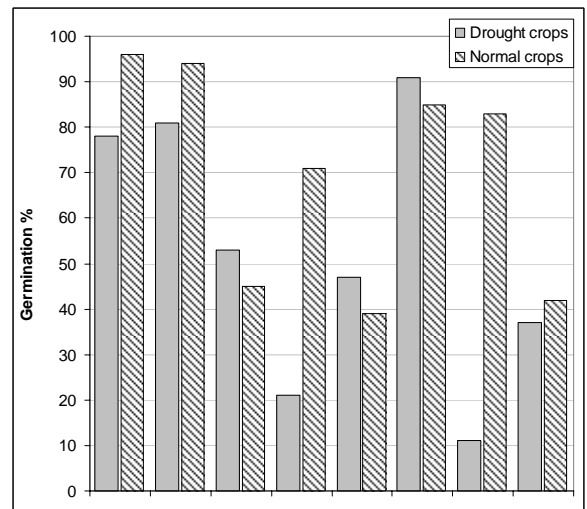


Figure 1: Comparison of germination percentage of screenings (<2 mm sieve) from drought affected crops. Source: N Phillips, unpublished data.

Data collected in 1998 from frosted wheat crops (Figure 2) indicates how a sudden cessation of growth effects germination capacity. The crops experienced a frost event that coincided with late-milk to early-dough stage. In both cases seed smaller than 2 mm had a very low germination. Grading out this seed had a significant impact on the germination of the seed lot as a whole.

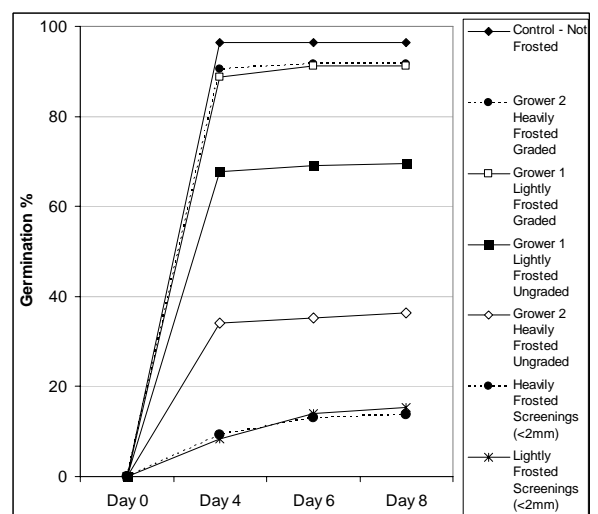


Figure 2: Germination percentage of frosted wheat. Source: N Phillips, 1999.



While there may be some crops in 2006 which mirror the 1998 data, it is likely that the cessation of growth in 2006 crops was less rapid. Additionally, some of the germination losses in 1998 may be due to ice damage in the cells of the seed, especially those at the milk stage. Often when screenings from frosted crops were germination tested they went mouldy, probably as a result of high sugar content.

A germination test is a seed viability test only. It will only tell you if the seed is capable of growing. It will not provide you with a measurement of all the properties required to give vigorous growth and consequently better establishment.

Store seed under cool dry conditions until January to allow the short term dormancy to break, then test it for germination capacity using an accredited laboratory. Home tests can be unreliable and will not identify weak or slightly damaged seedlings.

### Seed Vigour

Seed vigour is hard to define, but is the sum of those properties which determine the activity and performance of the seed during germination and emergence.

In simple terms, drought affects vigour by reducing seed size. Small seeds contain less starch reserves and less starch means less energy for emergence. It also means less energy to fight off seedling stresses such as disease or waterlogging.

A large seed will have a larger endosperm to drive germination and early growth compared to small seed but it may not necessarily be vigorous and visa versa. That said, a large well formed seed that has not experienced any weather damage or other damage in storage is likely to exhibit higher vigour than small seed or screenings.

No true vigour test exists. The accelerated ageing test is the nearest commercial approximation to a vigour test. The accelerated ageing test subjects the seed to temperature stress and tests germination over time. The time taken to reach maximum germination can be an indicator of vigour, as can a sowing depth test. However, sowing depth tests (in sand or soil) add additional complexity when trying to interpret results. Factors such as the temperature at which the test is conducted, soil fungi and seed size complicate it greatly.

Figure 3 compares the emergence of seed sown at different depths. The seed is from two identical lines of wheat seed (Janz) grown in the same year at the same location. One seed lot (low vigour) was inadvertently subjected to high temperatures in storage. Both were then sown into sterile soil. The effect on germination capacity was negligible, however, the low vigour line established poorly with increasing depth.

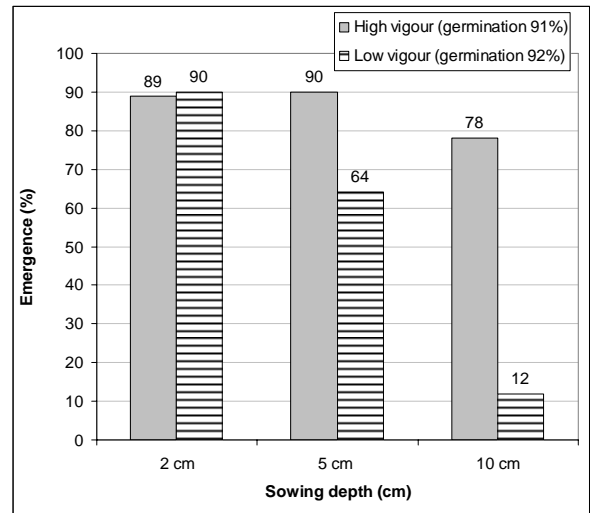


Figure 3: Comparison of emergence of seed sown at different depths. Source: N Phillips, 1992.

### Sowing Seed For 2007

- Choose varieties that are best suited to your area and needs.
- Don't assume next year will also be a late break so source seed from a range of maturity groups.
- Clean the header, silos and transport gear down thoroughly between seed paddocks to avoid varietal contamination.
- Keep accurate records of what is stored where and mark this on the silo.
- Only use seed with high germination levels, ideally above 90%. Where practicable, reject seed lots that are below 80%. Seed lots with a germination below 70% should only be used if no other source is available.
- Select seed from weed free paddocks where seed has reached at least soft dough stage and where the majority of seed is likely to be wider than 2 mm.
- Grading of seed may improve germination but may not always be cost effective
- Do not sow drought affected seed dry or too deep, and avoid seed or herbicide treatments that may reduce coleoptile length.
- Smaller seed size may allow you to reduce sowing rates in 2007.
- Be aware of your responsibilities under the PBR legislation.

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (December 2006). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.