

SOUTHERN DA FOCUS
2002 Plant Pop Project

Targeting optimum plant numbers

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Conditions, such as the 2002-03 drought, can substantially reduce seed germination and/or seed size.

It will be particularly important to check seed lots before sowing this season to ensure quality seed is sown. If germination and/or seed size is low, sowing rates will need to be adjusted to ensure target plant populations are met. It is also a good opportunity to review target plant populations and check they are appropriate for the variety being sown.

PADDOCK MONITORING 2002

In 2002 130 samples of wheat seed were collected from growers across southern NSW before sowing. They were tested for both 1000 seed weight, which is an indicator of seed size, and germination percentage:

- Germination was generally very good, with only three samples having a germination of less than 90%.
- There was a large variation in seed weights, ranging from 27.6g to 47.2g per 1000 seeds. There were no trends between varieties.

GERMINATION

Seed with germination of at least 90% is considered optimum. Seed with slightly lower germination can be used, but adjust sowing rates to compensate. If sowing seed with germination less than 80% (such as old or damaged seed), a problem with seed vigour is likely. Where low vigour is suspected, sow into ideal conditions where possible. Under adverse conditions, consider increasing sowing rates by 10-15% (as well as adjusting for low germination).

SEED SIZE

Seed size influences plant density, with large seeds requiring a higher sowing rate than smaller

Key Message

- Target plant numbers to account for differences in tillering capacity.
- Germination test seed if you think there may be a problem, such as after a drought or late frost, or if seed is old.
- Check 1000 seed weight from each seed lot each year.

Alter sowing rates to account for target population, seed size and germination.

seeds to target the same population. "1000 seed weight" is a measure of seed size. It should be determined for each seed lot, as results vary depending on how old the seed is and conditions it has been grown under.

Small seeds contain less starch reserves than larger seeds. Starch is a form of energy for seeds, so less starch means less energy to get the seedling out of the ground. It also means

Tip – for germination test

If a problem is suspected, a simple germination test can be done at home:

- Use a self draining container (nursery seedling trays are ideal).
- Line the base with a piece of paper to cover the holes.
- Fill with clean sand or potting mix.
- Press 50 seeds (5 rows of 10) into the soil at 2 to 3cm depth, and cover lightly with sand/potting mix.
- Keep moist (not too wet).
- Count the number of normal seeds germinated after 7-10 days.
- If less than 85% germinate, send sample to an accredited laboratory for confirmation.

OR

Send a representative sample of seed direct to an accredited laboratory.

Calculating sowing rates

The following formula can be used to calculate sowing rates, taking into account:

- target plant density,
- germination %,

- seed size,
- establishment - usually 80%, unless sowing into adverse conditions. (80%=0.8 in the formula)

$$\text{Sowing rate kg/ha} = \frac{(\text{target density} \times 1000 \text{ seed weight in grams} + 100)}{(0.8 \times \text{germination \%})}$$

For example: a grower has 2 seed lots, Diamondbird and Chara. Both varieties have 90% germination, but 1000 seed weight for Diamondbird is **35g** and for Chara is **42g**. To target the same plant density of 140 plants per m² for both varieties, Chara would need to be sown 14 kg/ha heavier than Diamondbird:

$$\begin{aligned} \text{Diamondbird} &= \frac{(140 \text{ plants} \times 35\text{g} \div 100)}{(0.8 \times 0.9)} \\ &= 68 \text{ kg/ha} \end{aligned}$$

$$\begin{aligned} \text{Chara} &= \frac{(140 \text{ plants} \times 42\text{g} \div 100)}{(0.8 \times 0.9)} \\ &= 82 \text{ kg/ha} \end{aligned}$$

Alternatively, if the Diamondbird and Chara had the same seed weight of 35g but the Diamondbird was **70%** germination and Chara **90%**, Chara would need to be sown 20 kg/ha lighter than Diamondbird to target the same plant density:

$$\begin{aligned} \text{Diamondbird} &= \frac{(140 \text{ plants} \times 35\text{g} \div 100)}{(0.8 \times 0.7)} \\ &= 88 \text{ kg/ha} \end{aligned}$$

$$\begin{aligned} \text{Chara} &= \frac{(140 \text{ plants} \times 35\text{g} \div 100)}{(0.8 \times 0.9)} \\ &= 68 \text{ kg/ha} \end{aligned}$$

Tip - 1000 seed weight:

- Count out 200 seeds.
- Weigh to at least 1 decimal point of a gram.
- Multiply weight in grams by 5.

less energy to fight off seedling stresses such as disease, waterlogging or false breaks.

Small seed - for example 1000 seed weight of less than 30g - should not be sown deep, and should only be sown where there is ideal moisture. Increase sowing rates by 10-15% to compensate for potentially low vigour.

TARGET PLANT DENSITY

Target plant densities should reflect the tillering capacity of the variety. For example, low tillering varieties (such as H45) should be sown at higher plant densities than high tillering varieties (such as Sunvale) to achieve target tiller numbers.



Plant counting, using a 50cm ruler

Target tiller numbers relate to the number of tillers that can be sustained to produce optimum yields. These often relate to rainfall, e.g. target tiller number for 500mm rainfall zone is approximately 500 tillers per m².

Note: Wheat can partly compensate for high or low plant populations by dropping tillers or increasing grain numbers. But targeting a variety's optimum plant number at sowing will make the most efficient use of available water and nutrients, which would otherwise be used in the compensation process.

MORE INFORMATION

Contact your District Agronomist for more information on this and related issues and visit the NSW Agriculture website on www.agric.nsw.gov.au

DISCLAIMER

The information contained in this publication is based on knowledge and understanding at the time of writing (March 2003). 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 Agriculture or the user's independent adviser.

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