



SOUTHERN

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GRDC™ GROWNOTES™



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GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

DURUM

SECTION 3

PLANTING

INOCULATION | SEED TREATMENTS | TIME OF SOWING | TARGET PLANT
POPULATIONS | CALCULATING SEED REQUIREMENTS – SOWING RATE |
SOWING DEPTH | SOWING EQUIPMENT

Planting

Key messages

- Use seed that has a high germination rate, is large and plump, is genetically pure, and is free of contaminants such as weed seeds and impurities of other winter cereals, in particular bread wheat and barley.
- Durum yield potential can be influenced by sowing date and variety choice.
- Highest yields are achieved from current durum varieties when sown early to mid season.
- If seeding is delayed, sowing varieties with larger grain size (i.e. Caparoi^(b), Saintly^(b)) may reduce screenings risk
- Aim for a seeding rate of 220 seeds/m² to maximise yield and quality.
- Sowing depth should be about 3–5 cm and not exceed 8 cm, as current durum cultivars are semi-dwarf with reduced coleoptile length which cannot penetrate greater soil depths.¹

3.1 Inoculation

Not required for this crop.

3.2 Seed treatments

Durum seed should be treated to control bunt, flag and loose smut. These diseases generally occur at low or trace levels but, in the absence of seed treatments, they have the potential to increase rapidly causing significant economic losses to growers. Where farmers decide not to treat seed for one year, they are advised to treat the following year. Bunt smut spores are spread from infected heads onto healthy seed during harvest. Loose smut spores spread in the wind at flowering time and infect developing embryos. Loose smut infection remains hidden inside the seed and so is more resistant to seed treatments than the surface borne bunt and covered smuts. Flag smut spores spread by wind from infected leaves and infect developing heads. They can also survive in soil for several years infecting subsequent crops. Where smut infection is observed, growers are advised to buy new seed and use the full rate of registered seed treatments. Ensure that any machinery that has been in contact with the diseased seed is cleaned. The accepted tolerance levels are nil for bunt and three infected pieces in half a litre of grain for loose smut. Any wheat exceeding these limits will not be accepted. There is a nil tolerance level for any smutted barley or oat grain.²

Quality seed for planting is essential. Only use seed that has a high germination rate and vigour, is large and plump, is genetically pure, and is free of all contaminants such as weed seeds and impurities of other winter cereals, in particular bread wheat and barley. Seed treatments are applied to seed to control diseases such as smuts, bunts or rust, and insects. When applying seed treatments, always read the chemical label and calibrate the applicator. Seed treatments are best used in conjunction with other disease-management options such as crop and paddock rotation, clean seed, and resistant varieties, especially when managing diseases such as stripe rust.

¹ GRDC (2014) Durum quality and agronomy fact sheet. Grains Research and Development Corporation, March 2014, <https://grdc.com.au/GRDC-FS-Durum>

² SARDI (2017) Cereal Seed Treatments 2017 http://pir.sa.gov.au/_data/assets/pdf_file/0005/237920/cerealseedtretrat2017_web.pdf

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[Cereal seed treatments 2016](#)

With the recent spread of Russian wheat aphid through parts of the Southern Cropping region, growers should keep an eye out for recommendations for the application of Imidacloprid when cereals (including durum) are sown early in the sowing period.

Agronomist's view

The economic benefits of this kind of treatment have previously been questioned, but with the price of Imidacloprid seed treatments dropping, and the expansion of potentially threatening aphids, seed treatments are an important first step in protecting crops.³

CropCare has launched a new product, Pontiac®, which is registered to provide broad spectrum control of seed and two soilborne fungi in cereals as well as control of aphids and other stored grain insect pests through the combination of flutriafol, metalaxyl-m and imidacloprid.⁴

There are risks associated with using seed treatments. Research shows that some seed treatments can delay emergence by:

- slowing the rate of germination, or
- shortening the length of the coleoptile, the first leaf and the sub-crown internode.

If there is a delay in emergence due to decreased vigour, it increases exposure to pre-emergent attack by pests and pathogens, or to soil crusting. This may lead to a failure to emerge. The risk of emergence failure increases when seed is sown too deeply or into a poor seedbed, especially in varieties with shorter coleoptiles. As the amount of certain fungicides increases, the rate of germination slows (Figure 1).

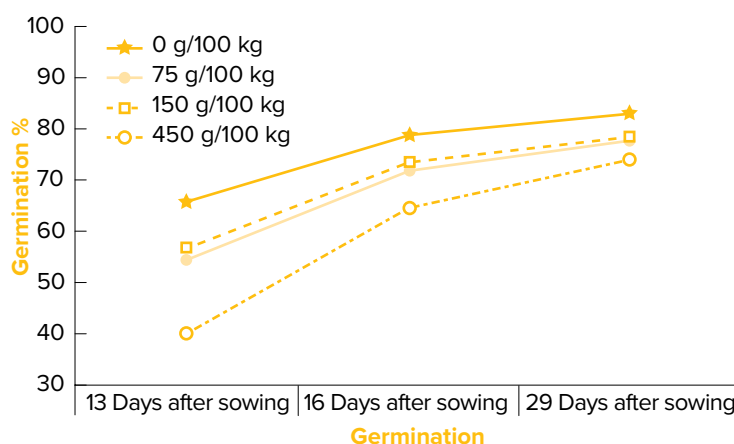


Figure 1: Impact of seed-treatment fungicide on the rate of germination.

Source: based on P Cornish 1986

Product registrations change over time and may differ between states and between products containing the same active ingredient. The registration status for the intended use pattern in your state must be checked on the current product label prior to use.⁵

³ Tony Craddock (2016). Personal Communication.

⁴ SARDI (2017) Cereal Seed Treatments 2017 http://pir.sa.gov.au/_data/assets/pdf_file/0005/237920/cerealseedtrear2017_web.pdf

⁵ NSW DPI District Agronomists (2007) Wheat growth and development. PROCROP Series, NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0006/449367/Procrop-wheat-growth-and-development.pdf

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[GRDC Targeted nutrition at sowing Factsheet](#)

3.2.1 Fertiliser at seeding

The amount of nitrogen safely placed with the seed will vary depending on soil texture, amount of seedbed utilisation and moisture conditions. Higher amounts of nitrogen can be safely applied with the seed if it is a polymerised form of urea where the nitrogen is released over the period of several weeks. If soil moisture is marginal for germination, high rates of fertiliser should not be placed with the seed. Both nitrogen and phosphorous can be banded prior to seeding, but take care to avoid loss of seedbed moisture and protective crop residue. Place phosphorous with or near the seed at seeding time or band prior to seeding.⁶

3.3 Time of sowing

Time of sowing is a critical factor in crop risk management. The optimal sowing time for durum is a compromise. Changes in sowing date and/or sowing location can dramatically affect development through the varying thermo-photoperiodic conditions that they create.⁷ Sowing too early increases the risk of frost damage and haying-off, while sowing too late increases the chance of grain filling during increasingly hot and dry conditions.⁸ Growers should aim to minimise the combined risks of frost damage or moisture stress around flowering/grain filling, and rain or storm damage just prior to harvest. None of these risks can be eliminated, but minimisation is possible. The optimum sowing date will depend on the maturity rank of the variety, latitude of the sowing site and topographic aspect (e.g. north/south facing slope, elevation).

Durum yield potential is influenced by sowing date. Durum wheats can perform well when sown later, but grain yields will depend on seasonal conditions, especially during the flowering and grainfilling stages. Three years of trials by the Grains Research and Development Corporation have shown that varietal yield rankings change with sowing dates (Table 1). The new durum varieties expressed their improved yield potential to the greatest degree at early to mid-season sowing dates, and yield differences among varieties are less pronounced with late sowing, irrespective of seasonal conditions. Varieties with higher yield potential, such as Yawa®, WID802®, and Hyperno®, are favoured most by early sowing (1–15 May). At later sowing, yield differences among new varieties are negligible, but screenings have been more prominent. Therefore, larger grained varieties such as Caparoi®, Tjilkuri®, Saintly® and Aurora® are preferred if sowing is delayed because they are less likely to be downgraded from small grain screenings.⁹ Varieties with smaller grain size should be avoided if sowing is delayed.¹⁰

6 Alberta Agriculture and Forestry (2016) Fall Rye Production. Alberta Government, [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex1269/\\$file/17_20-1.pdf](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex1269/$file/17_20-1.pdf)

7 F Giunta, R Motzo, A Viridis (2001) Development of durum wheat and triticale cultivars as affected by thermo-photoperiodic conditions. Australian Journal of Agricultural Research 52(3) 387-396, <http://www.publish.csiro.au/paper/AR00034>

8 PIRSA. Impact of dry sowing, frost, crop type and variety. http://pir.sa.gov.au/_data/assets/word_doc/0005/241583/Impact_of_dry_sow_frost_crop_type_and_variety.doc

9 GRDC (2015) Final Report – Durum expansion in SA through improved Agronomy – DGA00001. Grains Research and Development Corporation, March 2015, <http://finalreports.grdc.com.au/DGA00001>

10 GRDC (2014) Durum quality and agronomy fact sheet. Grains Research and Development Corporation, March 2014, <https://grdc.com.au/GRDC-FS-Durum>

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Table 1: Effect of sowing date on durum varietal yield performance in trial area.

Variety	Early sown (May 1–15)	Mid sown (May 15–June 5)	Late sown (after June 15)
Caparoi(D)	98	95	103
Saintly(D)	107	107	105
Tjilkuri(D)	113	108	107
WID802(D)	117	112	106
Hyperno(D)	120	109	106
Yawa(D)	123	118	106
Tamaroi(D)	100	100	100
Tamaroi(D) avg yield	4.44 t/ha	4.60 t/ha	4.31 t/ha

Source: Grains Research and Development Corporation

VIDEOS

WATCH: [GCTV Extension Files: Early sowing opportunities](#)



WATCH : [Over the Fence South: Early sowing protects crops from winter wet.](#)



3.3.1 Early / dry Sowing

Early sowing helps maximise yield and minimises the likelihood of quality downgrades due to high screenings levels.¹¹

Crop growth and haying-off risks with early sowing

Given adequate rainfall and soil moisture, early sowing can set the potential for high yields. It aids fast establishment and good early growth due to warmer days. Biomass contains carbohydrates, allowing for grains to fill later in the season. Strong early growth provides more heads and more potential grains in each head.

Very early sowing of an early maturing variety with little or no vernalisation requirement and relatively insensitive to day length (for example, Axe(D)) will cause rapid development. The lack of biomass at flowering will reduce the numbers and size of heads and the number of grains. The lack of root depth will also limit the crop's ability to access moisture later in the season, leading to lower yields.

The yield loss from delayed sowing within the window is not large on average but can be high in dry years. Modelling over 30 years showed delaying sowing in the Victorian Mallee from 1 May to 1 June caused an average two per cent yield loss. In two of these years the yield loss was 0.5 tonnes per hectare. Similar results have been seen in trials across the southern region (Figure 2). In seasons with a dry finish, early sowing (within the sowing window) has generally resulted in lower screenings and higher yields as crops mature during milder conditions. In those years, the benefit from early sowing in reducing moisture and heat stress has outweighed the effects of frost damage. However, if high rates of nitrogen are applied upfront in early-sown crops, growth before flowering can be excessive. If moisture is limited during grain fill, the canopy will have limited capacity to fill all grains, leading to higher screenings and lower yields – even in the absence of frosts.

Frost risk of early sowing

The main risk of early sowing is frost between flowering and early grain fill. The optimal flowering window is based on long-term climatic data. However, frosts can still occur during the flowering window. Winter wheats can be sown early where frost risk is a concern – as their cold requirement delays flowering.

Sowing time effect on disease

Foliar diseases

Earlier sowing tends to increase the severity of yellow leaf spot, Septoria tritici blotch and barley yellow dwarf virus (BYDV). Wheat streak mosaic virus (WSMV) and BYDV can also be worse with early sowing however, for BYDV it depends on timing of

¹¹ GRDC (2014) Durum quality and agronomy fact sheet. Grains Research and Development Corporation, March 2014, <https://grdc.com.au/GRDC-FS-Durum>

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the aphid flight. Warmer temperatures in early autumn favour wheat curl mite that transmit WSMV. Delaying sowing is not a useful tool to aid stripe rust control as it is not consistently affected by sowing time. Early sowing can provide the benefit of the crop being more advanced when the disease arrives in a district. Conversely, early sowing can also increase levels of stripe rust at early crop stages due to warmer temperatures in early autumn favouring rust cycling, and allow adult plant resistance to start working at a later growth stage.

Root diseases

Growers can identify the risk of significant soil-borne and crown diseases with a PreDicta B™ soil test. Delayed sowing increases the severity of Rhizoctonia, cereal cyst nematode, *Pratylenchus* and crown rot. This is due to slower root growth with late sowing.

Delayed sowing can increase yield loss and screenings from crown rot, which is worsened by moisture and heat stress during grain fill. The effects are more severe in seasons with a hot and dry finish. Take-all is less severe in later sown crops but only if weeds are controlled and inoculum has decomposed before sowing.¹²

Earlier sowing results in a greater number of tillers that survive to produce a head (Figure 2). With winter wheat and some spring cultivars, earlier sowing results in more leaves prior to first node stage (GS31), and since each leaf has a tiller bud, the crop has more time to grow tillers before the appropriate development stimuli signal (vernalisation, day length and temperature) for the crop to enter stem elongation. Generally, with spring wheats (including durum) the cultivar's sowing date has less influence on tiller number since leaf number and resultant tiller number is more predetermined (the crop has less requirement for vernalisation prior to stem elongation). However, tillers from early sowings of spring cultivars have longer to grow and as a consequence their survival to produce a head is usually greater from early sowings.¹³

¹² GRDC (2011). Time of Sowing. Impact on yield and quality of wheat. <https://grdc.com.au/resources-and-publications/all-publications/factsheets/2011/03/time-of-sowing>

¹³ GRDC (2014) Advancing the management of crop canopies. Grains Research and Development Corporation, January 2014, <http://www.grdc.com.au/CanopyManagementGuide>

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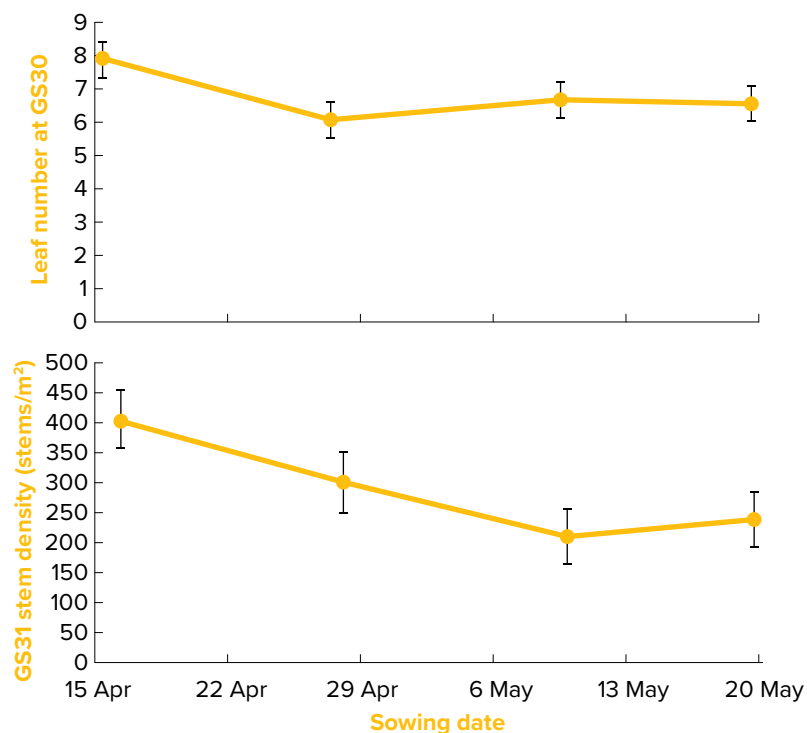
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Figure 2: Influence of sowing date on leaf number at the start of stem elongation (GS30; top graph) and tiller number at first node (GS31; bottom graph) – Temora, NSW (Hunt et al 2011).

Source: Grains Research and Development Corporation

Spread the risk:

- Don't commit your whole cropping program to any one seeding option.
- Not all paddocks are suitable for very early seeding.
- Soil type, surface cover and weed burden all need to be considered.
- Reduce the risk of frost damage by seeding higher elevated paddocks first. ¹⁴

Dry seeding can:

- reduce seeding time when rain occurs
- maximise the length of growing season available to crops
- limit the yield reduction due to a late break to the season
- minimise the impact of delays due to excess rainfall
- reduce the amount of seeding and stress once the break occurs
- maximise efficiency of machinery and labour.

Dry seeding is generally most successful:

- in light soils
- when the soil is very dry (not patchy or marginal)
- where there is a low weed burden, or a low-cost control strategy is available
- where wind erosion risk is low.

¹⁴ PIRSA (2003). Impact of dry sowing, frost, crop type and variety. http://pir.sa.gov.au/_data/assets/word_doc/0005/241583/impact_of_dry_sow_frost_crop_type_and_variety.doc

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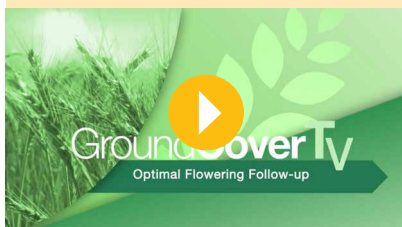
[GRDC Time of Sowing Factsheet – Southern Region.](#)

VIDEOS

WATCH : [GCTV Extension files: Wheat sowing strategies.](#)



WATCH : [GCTV15: Optimal flowering – follow up.](#)



If there are high levels of brome grass or herbicide resistant ryegrass present it can result in major weed blow outs!

Agronomist's view

Dry seeding can be hard on equipment due to hard, dry soils and dust.

Dry seeding works best where:

- paddocks or soils –
- will be seeded no matter when the season breaks
- have low, or controllable, weed burdens
- won't erode or fill in furrows (which can result in excess soil cover and poor emergence)
- have low levels of disease and few soil-living mites and insects.
- there is sub-soil moisture
- low nitrogen rates can be used safely
- soils will provide good seed-to-soil contact without the risk of excessive soil throw or herbicide damage
- crops are sown that don't require the use of highly soluble post-sowing pre-emergent herbicides that could cause crop injury if applied to dry soils.

Risks from dry seeding include:

- wind erosion
- inability to easily or cheaply control weeds
- seedling death due to multiple small falls of rain after germination
- fertiliser toxicity
- lack of subsoil moisture to produce economic yields
- input costs are committed whether or not the rain arrives
- the growing season does not suit the dry-seeded crop
- diseases
- insects
- poor crop establishment due to seeding depth, poor seed-to-soil contact or herbicide damage¹⁵

3.4 Target plant populations

Aim for a seeding rate of at least 220 seeds/m² in medium to higher rainfall areas to maximise yield and quality.

Plant population, determined by seeding rate and establishment percentage, can be an important determinant of tiller density and, at a later stage, head density. High yields are possible from a wide range of plant populations, because wheat compensates by changing the number of tillers and the size of the heads in response to the environmental conditions, including weather, fertility and plant competition.

Despite this ability to compensate, targeting a variety's optimum plant density at sowing makes the most efficient use of water and nutrients. To reach a target plant population for the environment and seasonal conditions, adjust sowing rates to allow for:

- sowing date – higher rates with later sowings
- seed germination and vigour percentage
- seed size

¹⁵ PIRSA (2003). Impact of dry sowing, frost, crop type and variety. http://pir.sa.gov.au/_data/assets/word_doc/0005/241583/Impact_of_dry_sow_frost_crop_type_and_variety.doc

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- seedbed conditions
- tillage, e.g. no-till
- double-cropping
- soil fertility
- soil type
- field losses ¹⁶
- soil moisture and seasonal outlook
- weed seed burden – use higher sowing rates for increased plant competition, e.g. if combatting herbicide resistant ryegrass populations.

Guidelines for durum

Chances of optimal yields are improved by establishing at least 160 – 200 plants/m² even in seasons of low rainfall. With irrigation, high-yielding dryland conditions or very early and very late plantings, populations of at least 1,000,000 plants/ha are recommended. Plant populations below this rate may result in a reduction in yield and increased weed competition. ¹⁷ An establishment figure of 70% means that for every 10 seeds planted, only seven will emerge to produce a plant. Planting rate to achieve 160 – 200 plants/m² is normally in the range of 100-110 kg/ha. ¹⁸

3.5 Calculating seed requirements – sowing rate

Sowing rate can be considered a risk-management tool. Dense stands of plants tend to produce fewer tillers per plant (i.e. the primary and a few secondary), whereas stands at a reduced density have plants that produce a larger number of tillers per plant. These reduced-density stands have greater flexibility in response to changing growing conditions. For example, if moisture is limiting, fewer tillers are initiated; however, if seasonal conditions improve, additional tillers may develop. ¹⁹

A sowing rate of 100-110 kg/ha is given as a general guide. However, growers may consider a variation, higher or lower, to benefit their situation. A reduced germination percentage or a late sowing will make it necessary to increase this rate. ²⁰ Current advice is that seeding rates should be maintained at 200 seeds/m² to maximise yield and quality in all varieties across the Southern Australian durum growing environments. ²¹

Because seed sizes may vary depending on production years and variety type, a fixed quote for the weight of seed needed to sow 1 ha is not always an accurate measure for obtaining a desired plant population per hectare. Average graded seed sizes are:

- large, 24,000 seeds/kg
- medium, 27,500 seeds/kg
- small, 30,000 seeds/kg

The following formula (Figure 3) can be used to calculate sowing rates, taking into account:

- target plant density
- germination percentage

¹⁶ NSW DPI (2008) Wheat growth and development – PROCROP Series. NSW Department of Primary Industries, February 2008, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0008/516185/Procrop-wheat-growth-and-development.pdf

¹⁷ DAFQ (2012) Wheat – planting information. Department of Agriculture and Fisheries Queensland, 1 August 2012, <https://www.daf.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/wheat/planting-information>

¹⁸ Tony Craddock. (2016). Personal communication.

¹⁹ R Hare (2006) Agronomy of the durum wheats Kamilaroi, Yallaro, Wollaroi and EGA Bellaro – Primefact 140. NSW Department of Primary Industries, April 2006, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0007/63646/Agronomy-of-the-durum-wheats--Primefact-140-final.pdf

²⁰ R Hare (2006) Agronomy of the durum wheats Kamilaroi, Yallaro, Wollaroi and EGA Bellaro – Primefact 140. NSW Department of Primary Industries, April 2006, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0007/63646/Agronomy-of-the-durum-wheats--Primefact-140-final.pdf

²¹ GRDC (2015) Final Report – Durum expansion in SA through improved Agronomy – DGA00001. Grains Research and Development Corporation, March 2015, <http://finalreports.grdc.com.au/DGA00001>

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- seed size
- establishment, usually 80%, unless sowing into adverse conditions

To calculate 1000 seed weight:

- count out 200 seeds
- weigh to at least 0.1 g
- multiply weight (g) by 5 ²²

Example

1000 seed weight (grams) 35 -----	X	target plant population (/m ²) 140 -----	X 100	÷	establishment % X germination % 80 X 90 -----
= Your seedling rate 68 kg/ha					

Your calculation

1000 seed weight (grams) -----	X	target plant population (/m ²) -----	X 100	÷	establishment % X germination % -----
= Your seedling rate ----- kg/ha					

Figure 3: Seeding rate calculator.

3.6 Sowing depth

For wheat seed to emerge successfully from the soil, the seed should never be planted deeper than the coleoptile length. The coleoptile is the pointed, protective sheath that encases the emerging shoot as it grows from the seed to the soil surface (Photo 1).

²² P Matthews, D McCaffery, L Jenkins (2014) Winter crop variety sowing guide 2014. NSW Department of Primary Industries, <http://www.dpi.nsw.gov.au/agriculture/broadacre/guides/winter-crop-variety-sowing-guide>

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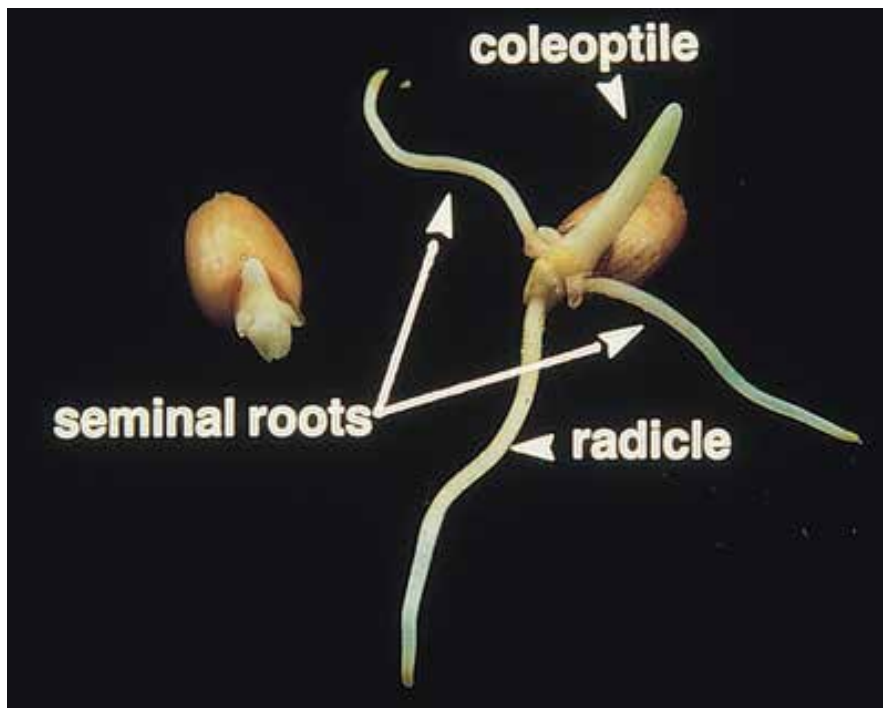
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Photo 1: The coleoptile is the pointed, protective sheath that encases the emerging shoot as it grows from the seed to the soil surface.

Photo: David L. Hansen

While durum varieties have a narrow range in coleoptile lengths, this is an important characteristic to consider when planting a wheat crop, especially in drier seasons when sowing deep to reach soil moisture. Sowing varieties with short coleoptile lengths too deep can cause poor establishment, as the shoot will emerge from the coleoptile underground and it may never reach the soil surface (Photo 2).²³

In a cultivated or chemically well-prepared seedbed, the sowing depth should be about 3–5 cm and not exceed 6 cm.

It is important to consult local information for the most effective sowing dates, rates and depths.

²³ J Pumpa, P Martin, F McCrae, N Coombes (2013) Coleoptile length of wheat varieties. NSW Department of Primary Industries, February 2013, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0006/459006/Coleoptile-length-of-wheat-varieties.pdf

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Photo 2: The difference in emergence and development between wheat sown at 30 to 35 mm and too deep and too shallow.

Source: Grains Research and Development Corporation

Crop emergence is reduced with deeper sowing because the coleoptile may stop growing before it reaches the soil surface, with the first leaf emerging from the coleoptile while it is still below the soil surface. As it is not adapted to pushing through soil (does not know which way is up) the leaf usually buckles and crumples, failing to emerge and eventually dying.²⁴ Similarly, emergence and vigour can be reduced with shallow sowing where impacts such as dry soil and herbicide residues can be involved (Photo 2).

For more information, see Section 4: Plant growth and physiology.

3.7 Sowing equipment

As much as 60% of the final yield potential for a crop is determined at planting. Seeding too thinly, using poor quality seed, and uneven stands result in end-of-season yield losses that cannot usually be overcome.²⁵

Seeder calibration is important for precise seed placement and seeders need to be checked regularly during sowing (Photo 3).

Conventional sowing equipment can be used for sowing durum seed, but the larger grain size of durum may necessitate appropriate adjustments.²⁶ Preferably use minimum disturbance equipment with a press wheel adjusted to soil and moisture conditions.²⁷

Most growers in the Southern Region use either a knife-point/press-wheel tyne system or a single disc. Disc seeders can handle greater quantities of stubble but can experience crop damage issues with pre-emergent herbicide use. Tyne seeding

²⁴ NSW DPI Agronomists (2007) Wheat growth and development. PROCROP Series, NSW Department of Primary Industries 2007, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0006/449367/Procrop-wheat-growth-and-development.pdf

²⁵ W Thomason (2004) Planting wheat: seeding rates and calibration. Virginia Cooperative Extension, <http://www.sites.ext.vt.edu/newsletter-archive/cses/2004-10/plantingwheat.html>

²⁶ DAFO (2012) Durum wheat in Queensland. Department of Agriculture and Fisheries Queensland, 26 June 2012, <https://www.daf.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/wheat/durum-wheat>

²⁷ J Kneipp (2008) Durum wheat production. NSW Department of Primary Industries, November 2008, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0010/280855/Durum-wheat-production-report.pdf

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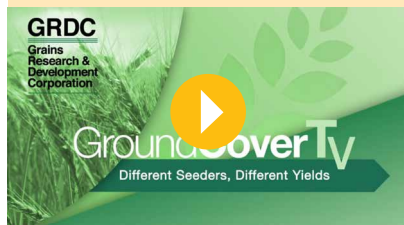
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VIDEOS

WATCH : [SFS seeder trial.](#)



WATCH : [GCTV19: Different seeders different yields. Local R&D – valuable solutions for the HRZ grain growers.](#)



systems do not have the same herbicide safety issues but usually require some form of post-harvest stubble treatment, such as mulching or burning.



Photo 3: *Seeder calibration is important for precise seed placement and seeders need to be checked regularly during sowing.*

Photo: Rohan Rainbow