



SOUTHERN

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GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

DURUM

SECTION A

INTRODUCTION

CROP OVERVIEW | GROWING REGIONS | BRIEF HISTORY | ECONOMICS OF
DURUM PRODUCTION

Introduction

Key messages:

- Premium durum grain is known for its hardness, protein, intense yellow colour, nutty flavour and excellent cooking qualities.
- It has vitreous, amber-coloured kernels with a minimum protein of 13%.
- Durum wheat differs from the other wheats in having endosperm that does not break into fine flour when milled but into coarse semolina, ideal for pasta making.
- In south-eastern Australia durum is grown primarily under rain fed conditions (sown in May–June) characterised by dry, hot summers alternating with humid and temperate winters (harvested in November–December).¹

A.3 Crop overview

Durum wheat (Photo 1; *Triticum turgidum* L. subsp. *durum* Desf. Husn.) or pasta wheat is an important crop for the human diet and is known for its hardness, protein, intense yellow colour, nutty flavour and excellent cooking qualities.² In Australia, durum production averages ~400,000 tonnes (t) but has fluctuated substantially between ~50,000 and 800,000 t over the period 1995–2008.³ In 2005–06, production was ~450,000 t, with New South Wales (NSW) accounting for around 67% and South Australia (SA) around 26% of current production (Table 2). The balance is produced in Queensland, Victoria and Western Australia (WA).⁴

FAQ

Australian durum (ADR1) consists of selected wheat varieties with vitreous, amber-coloured kernels with a minimum protein of 13%. Durum wheat differs from the other wheats in having endosperm that does not break into fine flour when milled but into coarse semolina, ideal for pasta making. The free-milling grain is capable of achieving high yields of superior quality semolina with minimal residual flour production. The semolina produced from this specialised wheat exhibits high levels of stable yellow pigment and high water absorption, making it ideally suited to the production of a wide range of high quality wet and dry pasta products with excellent colour and shelf life. Durum is produced primarily in SA, northern NSW, Queensland and areas where hard and prime hard wheat are grown. There is growing production within the Wimmera district of Victoria. Tonnages produced are sufficient to satisfy domestic requirements and, increasingly, international market demands.⁵



Photo 1: *Durum wheat.*

Photo: Rachel Bowman

- ¹ M Sissons, B Ovenden, D Adorada, A Milgate (2014) Durum wheat quality in high-input irrigation systems in south-eastern Australia. *Crop and Pasture Science*, 65(5), 411-422
- ² M Sissons (2004) Pasta. In *Encyclopedia of grain science*. (Eds C Wrigley, H Corke, C Walker), Elsevier Academic Press: London
- ³ R Ranieri, G Worden, ML Seghezzo, C Mills (2012) Marketing perspectives in the durum wheat trade. In *Durum wheat chemistry and technology*, 2nd edn (Eds M Sissons, J Abecassis, B Marchylo, M Carcea) AACCI International: Saint Paul, Minnesota, USA
- ⁴ 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
- ⁵ AWB (2014) Australian wheat. Australia Wheat Board, <http://www.awb.com.au/customers/australianwheat/>

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Over the last few years, increasing emphasis has been placed on supplying wheat of specific qualities as flour milling and processing industries overseas have become more sophisticated. Current markets require wheat grades in which there is a balance between grain hardness and protein content for different end uses. Figure 1 shows the relevant protein hardness values and the different end uses for each grade of wheat.

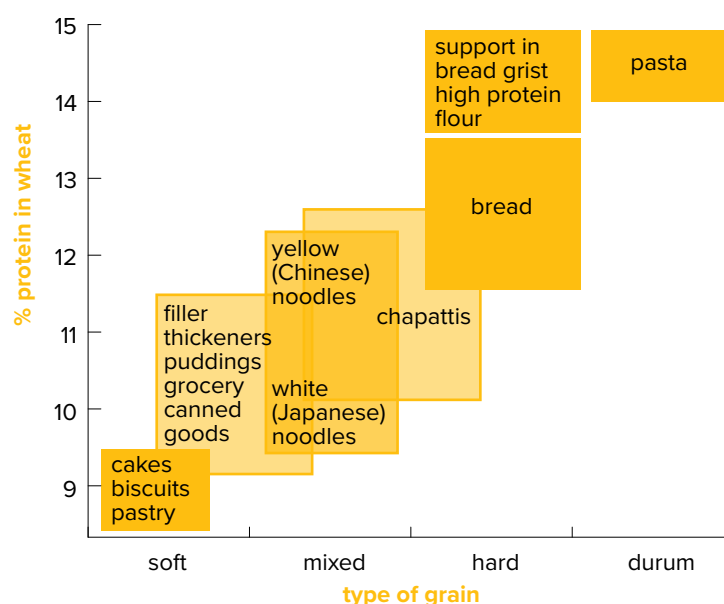


Figure 1: Balance between protein content, hardness and end-product requirements.

Source: Weston Milling

Durum wheat should only be grown on highly fertile soils where high protein grain can be produced, as protein levels >13% are required to meet premium market grades. Protein levels below 10% can be marketed only as feed, although grain with a protein between 10-13% can still be marketed as lower grade durum.⁶ In south-eastern Australia durum is grown primarily under rain fed conditions (sown in May–June) characterised by dry, hot summers alternating with humid and temperate winters (harvested in November–December).⁷

New breeding material has shown promise in the lower rainfall areas with yields similar to bread wheat varieties in average seasons. Durum varieties tend to be more sensitive to low levels of zinc and trials have given large yield increases with the application of zinc where zinc was limiting. In areas where high protein wheat can consistently be produced, newer durum varieties may be a profitable option, especially when there is a large price differential between durum and hard wheat.⁸

On receipt at a mill, durum grains are cleaned to remove chaff and foreign material. Grain is then milled to remove the bran and germ. The remaining endosperm is cracked into coarse pieces and then ground very, very finely into semolina for pasta making. ADR1 yields high levels of top quality gluten, associated with high grain

⁶ 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

⁷ M Sissons, B Ovenden, D Adorada, A Milgate (2014) Durum wheat quality in high-input irrigation systems in south-eastern Australia. *Crop and Pasture Science*, 65(5), 411-422

⁸ PIRSA http://pirsa.gov.au/_data/assets/word_doc/0005/241583/Impact_of_dry_sow_frost_crop_type_and_variety.doc

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protein. This means the pasta dough has good stretch, texture and durability and is able to hold its shape when cooked.⁹

A.4 Growing regions

The southern durum growing region stretches from Victoria, Tasmania and South Australia and the south-west corner of Western Australia. The rainfall pattern ranges from uniform in central New South Wales through to winter-dominant in Victoria, Tasmania, South Australia and Western Australia.

This is a vast region of the country, with a typically Mediterranean climate of dry summers and comparatively reliable winter rainfall lending itself to winter crop production.

Planting of the winter crop depends on “opening rains” and usually begins in May and can continue through until late July. The winter crop harvest can begin in late October and continue through until January in the higher rainfall areas.¹⁰

Durum is grown through Victoria, Tasmania and SA (Table 1) up to central NSW (south of Dubbo) and through the south-west corner of WA. Rainfall patterns range from winter-dominant in Victoria, Tasmania, SA and WA through to uniform in central NSW.

⁹ GRDC (2014) Durum quality and agronomy fact sheet. Grains Research and Development Corporation, March 2014, <https://grdc.com.au/GRDC-FS-Durum>

¹⁰ AEGIC (2016) Australian grain production—a snapshot, <http://aegic.org.au/australian-grain-production-a-snapshot/>

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Table 1: Crop estimates by district in South Australian growing regions. South Australia's area of Durum production in 2016/2017. Greatest production was centred in Upper South East, Yorke Peninsula, Upper North and Mid North districts.

		Western Eyre Peninsula	Lower Eyre Peninsula	Eastern Eyre Peninsula	Yorke Peninsula	Upper North	Mid North	Lower North	Kangaroo Island
Wheat	ha	477 000	145 000	392 000	165 000	236 000	234 000	56 500	5 700
	t	955 000	553 000	1 019 000	676 000	637 000	936 000	243 000	12 500
Durum	ha	0	0	0	20 000	9 500	8 500	6 500	0
	t	0	0	0	71 000	26 500	33 500	25 000	0
		Central Hills & Fleurieu	Lower Murray	Nth Murray Mallee	Sth Murray Mallee	Upper South East	Lower South East	State Total	
Wheat	ha	4 500	66 000	245 000	124 000	65 000	22 000	2 237 700	
	t	11 000	164 000	490 000	322 000	188 000	70 000	6 276 500	
Durum	ha	300	600	300	0	9 500	0	55 200	
	t	650	1 300	500	0	24 000	0	182 450	

Source: [Primary Industries and Regions SA](#)

A.5 Brief history

Durum wheat was first produced in Australia in the early 1930s. Due to a combination of strong international prices, very high quality grain and improved export marketing facilities, Australian durum wheat production has made impressive growth from around 8,000 tonnes produced in northern NSW and SA in the late 1970s to current domestic production of around 500,000 tonnes.¹¹

The Australian durum wheat industry is highly competitive with the leading overseas producers (i.e. Canada, the United States, the European Union, Turkey and Syria). Australian durum quality is now regarded by Italian millers and producers as the best in the world.

Table 2: Historical durum wheat production in Australia, 1994–2007 (tonnes by State).

Season	Queensland	NSW	Victoria	SA	WA	Total production (tonnes)
1994–95	2,000	2,000	0	33,000	0	37,000
1995–96	6,000	55,000	0	65,000	1,000	127,000
1996–97	5,997	210,000	0	51,000	0	266,997
1997–98	4,971	200,600	0	82,601	0	288,172
1998–99	10,737	303,730	0	84,429	984	399,880
1999–00	51,382	527,358	0	142,423	5,120	726,283
2000–01	6,334	138,696	0	269,524	4,009	418,830
2001–02	6,033	380,696	0	405,565	4,142	796,283
2002–03	8,100	55,000	0	162,000	3,000	228,100
2003–04	47,700	337,000	2,000	217,900	6,895	611,495
2004–05	50,000	375,000	2,000	220,000	7,000	654,000
2005–06	16,230	297,135	6,500	117,086	5,200	442,151

¹¹ DPI NSW. (2016). Durum wheat production. <http://www.dpi.nsw.gov.au/agriculture/broadacre-crops/winter-crops/wheat-barley-and-other-winter-cereals/durum-wheat-production>

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Season	Queensland	NSW	Victoria	SA	WA	Total production (tonnes)
2006–07	10,000	125,000	10,000	50,000	5,000	200,000
5-year average	26,406	237,827	5,125	153,397	5,419	427,149

Source: [NSW Department of Primary Industries](#)

Durum from southern Australia is also used in Coopers home brew kits which are shipped around the globe.¹²

The San Remo pasta manufacturer, in Adelaide, is the largest Australian user of durum at approximately 100,000 t annually (2008 data). This is forecast to rise to 200,000 t by 2023. The other major user is the food manufacturer Rinoldi, in Melbourne.¹³

A.6 Economics of durum production

When grown using best production practices and under optimal conditions, durum can produce higher profits than bread wheat (Table 3).¹⁴ GRDC has worked with the South Australian Grain Industry Trust (SAGIT) and the Government of South Australia to develop a *Farm Gross Margin and Enterprise Planning Guide* which includes durum.

Table 3: Summary of calculations for gross margins in the 2016 bread wheat and durum wheat trials conducted as part of UA415 sponsored through SAGIT.

Bread / durum gross margin analysis							2016
		Low Yield	Low Yield	High Yield	High Yield	Average	Actual
		Low Price	High Price	Low Price	High Price	GM	Best GM
Coonalpyn	Bread	702	862	802	980	817	912
	Durum	1462	1737	1816	2146	1834	2035
Roseworthy	Bread	686	823	1095	1290	929	1095
	Durum	1697	1697	2176	2176	2019	2176
Sanderston	Bread	819	961	892	1044	947	1044
	Durum	258	1246	294	1357	1060	1357
Wandereah	Bread	380	475	562	684	539	684
	Durum	1164	1164	1385	1385	1284	1385
Yeelanna	Bread	359	629	548	898	655	790
	Durum	303	1067	353	1191	711	1067

Notes: The calculations for these gross margin figures can be found in the supporting documents. When assessing the gross margins the following points should be noted:

1. Input prices are as charged to the durum breeding group, and are in general higher than a farmer would pay due to product size.
2. Delivery charges and rail freight are to the nearest silo, and have been taken from either Viterra or AWB websites.
3. It is assumed all durum would be delivered to Balaklava, unless it only made feed quality in which case it would go to the nearest silo.
4. If screenings was the only limiting factor to a higher grade being paid, a cost of \$14 per tonne was deducted and the yield lowered to the amount it would be with 5% screenings. No value was placed on screenings. This makes the assumption that the protein will not drop with the removal of screenings.
5. These calculations do not consider a carry-over price or put a value on the need to store grain on farm, it only looks at a hectare of crop in the field.
6. At Sanderston, the farmer applied a protective application of rust control which was applied to both bread and durum. The durum did not need this spray and it has not been included in the cost of production.
7. The high, low, and average refer to the 4 durum and 4 bread wheat varieties grown in these trials.

¹² PIRSA (2016) South Australia food and wine: key messages and fast facts, April 2016, http://pir.sa.gov.au/_data/assets/pdf_file/0020/271208/SA_Food_and_Wine_Key_Messages_Fast_Facts.pdf

¹³ 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

¹⁴ SAGIT. (2016). Growing durum demand in SA: gross margin sensitivity analysis trials. http://durumgrowerssa.org.au/wp-content/uploads/2017/02/UA415-Supplementary-File-1_2016.pdf