

SOUTHERN AUSTRALIA DURUM INDUSTRY

Introduction:

The first durum crops commercially grown in South Australia were grown in 1990 and 1991. In 1990 twelve growers each multiplied two tonnes of the variety Yallaroi in order to produce 500 tonnes of seed, which in 1991 was distributed amongst another 40 growers to produce 13,700 tonnes.

The driver for this development was San Remo Macaroni Company, which prior to 1987 were reliant on semolina supplied from northern NSW flour millers for the production of pasta. The semolina supplied was a blend of durum and prime hard wheat, with large variations in quality. In 1987 San Remo took the decision to become a world class pasta manufacturer, requiring it to have an assured supply of quality durum wheat, which it could mill in its own semolina mill, to supply an on-site pasta plant.

The late Dr Tony Rathjen, the bread wheat breeder at the University of Adelaide's Waite Campus had from 1988 accumulated a collection of durums from North Africa, Italy and Mexico and grown a preliminary trial in that year. In 1989 San Remo approached Dr Rathjen for advice on whether it was feasible for durum wheat to be grown in SA. He believed that it was, and asked his Technical Officer, Jim Lewis to organise durum seed production.

Jim Lewis approached Two Wells farmer and seed producer Neville Sharpe to organise seed production on Yorke Peninsula and the Mid North. Neville organised twelve growers from Minlaton to Kapunda to do the initial multiplication, using 24 tonne of Yallaroi Seed (one semi-trailer load, which San Remo purchased from northern NSW).

In 1991, the South Australian Durum Growers Association Inc. was formed to coordinate the new industry, with John Lush of Mallala as Chairman and Neville Sharpe, Secretary.

San Remo Development and Involvement:

In 1989, San Remo decided to remain in South Australia and to build an integrated pasta manufacturing capability, involving durum storage, a semolina mill and a pasta plant. In 1990 San Remo's milling arm: Harley Milling commissioned their first semolina mill at Windsor Gardens, followed by a second mill in 2001.

During 1998, San Remo constructed the first stages of their new durum storages at Kulpara and Balaklava, and the second stages in 1999. Prior to this, the durum acquired by San Remo was stored at the SACBH Owen silo.

Importantly in the development of the durum industry in southern Australia San Remo has since 1989 provided significant funding for the Waite Durum Breeding Program, which in recent times (2011 onwards) has included funding for the purchase of trial seeding and harvest machinery.

Until recently, as part of the evaluation of new varieties, a batch of up to 50 tonnes of prospective varieties would be milled to produce a semolina from which pasta was produced prior to the variety being released.

Waite Durum Breeding Program:

From 1989, the University of Adelaide's Waite Campus has had an active Durum Breeding Program, with the late Dr Tony Rathjen having led the team. In 2011 upon Tony's retirement, Professor Jason Able took over the program and incorporated marker-assisted selection into the program for the first time. This facilitated an expansion of early generation germplasm being screened and therefore increased the capability of the program to evaluate much more parental germplasm than had been done previously..

In the initial stages of the program, all of the durum varieties grown in SA, were bred at Tamworth by the NSW Department of Agriculture (now NSW DPI), and its principal breeder Dr Ray Hare. These varieties bred for the very fertile basaltic soils of northern NSW, generally lacked adaptation for the more infertile South Australian soils.

So it was in the early 90's when Dr Tony Rathjen trialled such non-released lines from the Tamworth program to determine if any were better adapted than Yallaroi. In 1998, the industry saw the release of Tamaroi, which had demonstrated a 10% yield advantage over Yallaroi in SA trials. Gundaroi (another Tamworth line) was released in 1999.

In 2002, the release of the first Waite bred variety Kalka occurred, which had superior pasta making quality and pasta colour when compared with Tamaroi, as well as Boron tolerance and a higher yield. Other varieties including Hyperno and Saintly followed (both in 2008).

In 2007, the predominately GRDC funded Australian Durum Wheat Improvement Programme (ADWIP) commenced with two nodes: a northern node at Tamworth and a southern node at the University of Adelaide's Waite Campus. The latter to produce varieties for SA and the Wimmera in Victoria - particularly.

In 2010, the '800 series' of varieties were being evaluated for the final stages of release. These lines (Tjilkuri – WID801; WID802; and Yawa – WID803) were derived from wide crosses between durum and bread wheat lines that were highly adapted to local soils and agronomy at the time. The aim was to attempt to fast track adaptation to local conditions through the introgression of genetic material from the bread wheat varieties, which had 100 years of breeding and selection history in SA. The progeny were assessed at various "difficult" sites across SA prior to determining whether they would be released. Generally these sites had hostile subsoils (such as high pH, boron toxic, or saline) and often were grown where paddocks had been wheat-on-wheat across seasons, thus assessing crown rot tolerance/resistance potential. While high yielding and of exceptional quality, the 800 series of varieties tended to exhibit unacceptable levels of screenings under dry conditions (particularly with Yawa). These three varieties that Dr Rathjen bred, were his last, with Tjilkuri released in 2010, while WID802 and Yawa were released in 2012.

Since late 2010/early 2011 when Professor Able took over leadership of the southern node and breeding for the southern region of Australia, three additional varieties have been released. The very successful DBA Aurora (2015) was the first of these, and as of 2020, was the market dominant variety grown in South Australia and Victoria. Due to its broad adaptation, it has reached into new areas where growers as far North as Dalby in SE QLD grow it with success. In favourable seasons or on irrigation (in southern NSW), DBA Aurora has been shown to comfortably out-yield the highest yielding bread wheat varieties of the day. In southern irrigation zones it has yielded in excess of 10 t ha⁻¹ while in favourable seasons in rain-fed environments, it has yielded in excess of 6.5 t ha⁻¹. Beyond DBA Aurora, DBA Spes (2018) and DBA Artemis (2019) have followed. While not step change varieties like DBA Aurora, these two additional varieties gave growers other options if DBA Aurora happened to not suit their farming system.

Australian Grain Technologies have recently released two new durum varieties, with Bitalli (2019) and Westcourt (2019) being made available to the industry. Bitalli has been bred for the southern region while Westcourt appears more suitable for the northern regions of Australia's durum growing areas.

Looking ahead and without a doubt, the major challenge for significant expansion of the durum industry in southern Australia (but also northern regions of Australia where durum is grown in similar volumes), has been the occurrence of crown rot caused by several species of the fungus genus: *Fusarium*. This fungus particularly manifests itself with durum when compared to bread wheat, results in significant yield losses

through plant death as was evidenced in drought years like 1994 and 2006, and in years with dry spring conditions. Considerable research by Drs Hugh Wallwork and Marg Evans, in conjunction with collaborating through the late Dr Rathjen and in recent times with Professor Able, has led to the evaluation of several promising lines. Such breeding material has been evaluated at several SA and Victorian sites over the last few years (2017 onwards), and while some lines exhibit unacceptable quality attributes, crown rot tolerance has definitely been enhanced. Moving forward, it will be a case of refining the best selections with high yield potential, good quality, and the improved crown rot tolerance compared to what is already released in the industry. With enhanced crown rot tolerant varieties, the durum industry has the potential to significantly expand in not only southern Australia but also northern Australia (where this disease has caused that industry to contract substantially in the past five years).

Southern Australian Durum Growers Association:

Formed in 1991 as the South Australian Durum Growers Association, this body has had a major role in the release of new varieties, and in the provision of clean seed for the durum industry at affordable prices.

From the release of Tamaroi the association led by its Secretary and later Seed Manager: Neville Sharpe, developed a program of producing clean basic seed, distributed to three or four experienced seed growers, who produced clean seed, with oversight and quality assurance provided by independent agronomists, initially by Trevor Dillon, then Alan Mayfield and more recently Sam Trengove. Produced seed was made available off the header at prices initially \$60 above the commercial price of that grain, encouraging growers to widely adopt new varieties.

The other main activity of the association has been the development of a research program, funded primarily by GRDC and SAGIT but augmented with funds provided from agribusiness sponsorship (grain marketers, breeding companies and industry suppliers). Research has included work on nutrition to maximise quality and to assist the research on crown rot resistance. Then Chairman, John Green initiated this program in 2009. In return for their sponsorship, the association provides each sponsor with the opportunity to speak at forums and field days held each year in both the SA's Mid North and Victoria's Wimmera.

In 2013, the name of the Association was changed to THE SOUTHERN AUSTRALIA DURUM GROWERS ASSOCIATION INC to reflect the growth and involvement of the West Wimmera region of Victoria in the production of durum wheat. The pioneer of the durum Industry at Kaniva, Alwyn Dyer has been on the association committee since 2007 and was Chairman from 2016 until 2018. Prior to this in about 2000, the West Wimmera growers formed a West Wimmera Durum Growers Group, which in 2007 became Associate Members of the SA Durum Growers Association.

Alwyn Dyer began producing durum in 1994, after sourcing 0.5 tonne of Yallaroi seed in SA, and sowing 6 ha. In the drought year of 1994, the crop only yielded 1 tonne, after being badly affected with crown rot. He decided to give the crop another try and over 12 ha in 1995 it yielded 4 t ha⁻¹. Alwyn has grown durum ever since. Having observed Alwyn's success, within two to three years, neighbours began growing durum. After the first five years there has been a steady increase of growers in the West Wimmera and circa 2020 there are now about 30 growers producing durum under area contracts for San Remo. Alwyn also sold seed to other growers in the Brim and Victorian Mallee, some of whom also supply San Remo. There are another 10-15 growers in central and NE Victoria producing durum for a Melbourne pasta manufacturer.

Total production in the West Wimmera and associated areas supplying San Remo has grown as follows:

2001-2005: 2,000 tonnes per year average.

2006-2010: 4,000 tonnes per year average.

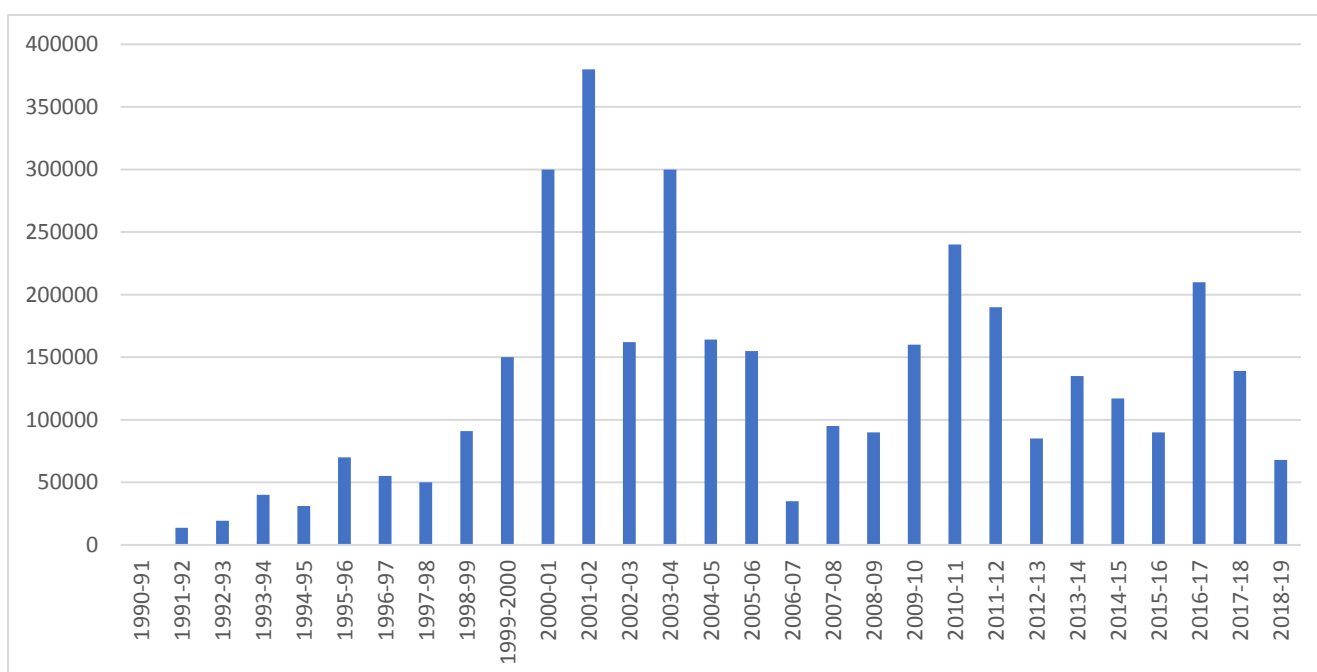
2011-2015: 15,000 tonnes per year average.

2016-2020: 20,000 tonnes per year average.

Marketing was a major issue for Alwyn initially, with the first commercial crop in 1995 having to be sold to AWB and trucked to Wallaroo. In the following year (1996) Alwyn negotiated a sale to San Remo and delivered it direct to the Windsor Gardens plant. That pattern continues with the West Wimmera durum being stored by the growers and then delivered direct to the Windsor Gardens mill.

The Association has hosted two industry dinners to recognise the contributions of both the late Tony Rathjen and Neville Sharpe in the initiation and development of the durum Industry in southern Australia. Professor Tony Rathjen's Dinner was held in July 2012 and Neville Sharpe's in Feb 2017.

Durum Production in South Australia based on data from San Remo and PIRSA:



Production in the first decade of the industry in SA, as numbers of durum growers increased to about 300, and with the release of the higher yielding Tamaroi in 1997, was spectacular with 380,000 tonnes produced in 2001-02. The amount produced was far in excess of San Remo's requirements, requiring export by the AWB. The first exports occurred after the 1995-96 harvest when 13,000 tonnes were exported to the high value Italian market. The dryness of the grain and high semolina yields gave marketing advantages for SA durum.

After the 2000-01 harvest, AWB exported 135,000 tonnes (predominately DR1 and DR2) into the Italian market. The following year even more was exported, with shipments going to Morocco for the cous-cous market. Unfortunately the weak yellow colour of Tamaroi produced an adverse reaction from this market, and the message quickly came back that any new varieties would have to have enhanced colour.

A major problem with the durum industry has been the highly variable production, mainly caused by the ravages of crown rot (discussed earlier). This has limited production in drier years, and resulted in growers withdrawing from the crop in years following the bad outbreaks. The numbers of growers producing durum in SA has declined from its peak of 400 in 2001 to 120-150 in 2020.

Wisely San Remo has maintained a strategy of sourcing supply from a number of regions to provide itself with security. For example during the 1990's it sourced some of its durum from the irrigated crop on Tandou Station in NSW. In the poor SA years of 2018-19 and 2019-20, the West Wimmera had reasonable years providing San Remo with adequate supply, the reverse being the case in 2015-16.

Since the abolition of the wheat export single desk held by the AWB in 2009, the Durum industry has had to rely on global grain traders to organise export sales of surplus grain. The high semolina yields and pasta quality from southern Australian durum has ensured that is often sort after to blend with lower quality wheat produced in the importing country.

Written by Leith Cooper in July 2020 to mark the 30th Anniversary of the commencement of Durum Production in Southern Australia.