

# 2019 HYBRID SORGHUM PERFORMANCE REPORT

JULY 2019



NORTHERN REGION



## FEATURING NVT DATA FROM THE 2018 AND 2019 HARVESTS

[grdc.com.au](http://grdc.com.au)

**Title:** 2019 Hybrid Sorghum Performance Report – Northern Region

**GRDC Project Code:** COR1805-003SAX

**Acknowledgements**

The GRDC NVT team sincerely thank the following contributors for their help, time and industry knowledge in compiling the content for this publication:

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In addition, GRDC would like to thank the numerous breeding companies and their representatives for their contributions.

**ISBN:** 978-1-921779-87-9 (print) 978-1-921779-88-6 (online)

**Published July 2019**

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# Introduction

Welcome to the first hybrid sorghum performance report published by the Grains Research and Development Corporation, following requests from growers to include sorghum as part of the National Variety Trials (NVT) testing program. This guide draws on the information obtained from numerous sources following the first two years of trials.

The aim of the sorghum NVT testing program is to provide growers with relevant information that will allow them to make informed choices when deciding what hybrid grain sorghum variety to sow in their paddocks. National Variety Trials seek to test the most relevant varieties for each region and test them alongside near to release lines from breeding companies.

For all the information on the released hybrid sorghum varieties tested in the NVT program conducted in New South Wales, Queensland and Western Australia, visit the website [www.nvtonline.com.au](http://www.nvtonline.com.au).

Sorghum was first grown in 1938, with hybrid sorghum varieties becoming available in 1962. The hybrids quickly gained the acceptance of growers and sorghum is now the dominant summer crop in GRDC's northern region.

It has been traditionally used by the domestic livestock industries (cattle, pork and poultry), while more recently there has been an increasing interest in the grain being used for ethanol production and for human consumption (gluten free and as a spirit).

## More information

GRDC *GrowNotes* [www.grdc.com.au](http://www.grdc.com.au) and NSW DPI Summer Crop production guide [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

## Key points

- This publication covers two seasons, 2017-18 and 2018-19, of the sorghum NVT testing program conducted in GRDC's northern region.
- It must be emphasised that the predicted yield values that appear in Appendix 1 are from only two seasons and should be taken in context. These values may not be representative of the long-term seasonal conditions experienced by growers in the selected regions.
- When choosing a hybrid grain sorghum variety, do not rely on the results from a single trial conducted at one location in only one year.
- Successful sorghum production is a combination of good agronomic practices combined with the best hybrids available for your conditions.
- Know your paddocks, measure the amount of available subsoil moisture, and test for nutrition status and soil-borne disease levels.
- Select at least two hybrids that meet your requirements, which reduces overall risk.
- Get timing right for every operation: sowing, spraying, desiccation and harvest.
- An even plant population across the paddock and along rows is crucial.



# Overview

**The sorghum NVT program.** Phase 1 of the sorghum NVT program began in July 2017 and encompassed four trialling regions and seven production zones. The program was continued for a second year, capturing two summer cropping seasons, 2017-18 and 2018-19, with the regions expanded in the second year to include Kununurra in Western Australia (Table 1). A total of 43 experiments were envisaged over the two seasons but 13 were discarded as they did not meet the rigorous standards set by the NVT protocols.

**Trial attrition.** Individual trials can be excluded from the final NVT database due to either statistical or agronomic reasons. If there is no genetic variance, that is, the grain yield of individual hybrids in a trial does not differ significantly, the trial will not be included in any further analysis. An independent audit has been carried out on all trials grown in four of the five regions over the past two seasons. Auditors were required to score more than 25 parameters and determine if an individual site met the stringent requirements of NVT. Trials were deemed unsuitable for inclusion on an agronomic basis for any of the following reasons: variable biomass across the site, uneven establishment across the site or along a row, presence of disease, animal or insect damage or the presence of weeds at populations that would affect grain yield. Trial sites also had to be representative of the region and sowing time similar to the surrounding crop.

**Trial sites.** Each production zone was to have three to four trial sites, with a single time of sowing within a production zone. For any given trial site, the soil moisture profiles were required to be greater than 80 per cent full, with not less than one metre of wet soil, having come out of long fallow from winter cereal

and be of a soil type representative of the zone. Row spacings were to follow industry standards. Successful trial sites within each region in each season appear in Table 2. Unfortunately, not all trials met the standards specified by the NVT protocols; however, there were 15 trials from 2017-18 and 10 trials from 2018-19 that have been deemed suitable for inclusion in the database.

**Number of varieties in each trial.** Breeding companies were invited to submit varieties for inclusion in the sorghum NVT project that they felt were suitable for the environments under evaluation. Grain sorghum hybrids were submitted from seven companies. The total number of unique varieties entered was 40 and varied, depending on trial location, from 25 to 37 in the trials conducted in Queensland and New South Wales while 11 varieties were included in the trial conducted in Western Australia.

**Traits investigated.** Several traits were measured across the project, including: grain yield (t/ha), screenings (%), hectolitre weight (kg/hl), lodging (1-9 scale), tillering (1-9 scale), vigour (1-9 scale) and head loss (1-10 scale). If an NVT trial is sown at a specific location the resulting year by location combination is called an environment. There were 27 environments analysed for grain yield, 21 for screenings and 22 for hectolitre weight. There were a total of 2040 individual plots harvested and environment mean yield ranged from 1.82t/ha to 8.02 t/ha.

**Service providers.** The trials were managed by four different service providers: New South Wales Department of Primary Industries, Kalyx Australia, Eurofins Agrosience and Living Farm.

**TABLE 1 Sorghum NVT regions and production zones.**

State	Region	Production zone	Boundary
Qld	Central Qld	Central Qld North	North of the Capricorn Highway
Qld	Central Qld	Central Qld South	South of the Capricorn Highway
Qld	Southern Qld	Southern Qld East	East of the Millmerran, Dalby, Chinchilla Road
Qld	Southern Qld	Southern Qld West	West of the Millmerran, Dalby, Chinchilla Road
NSW	Northern NSW	Northern NSW East	East of the Newell Highway
NSW	Northern NSW	Northern NSW West	West of the Newell Highway
NSW	Liverpool Plains	Liverpool Plains East	East of the Boggabri to Coolah Road
WA	Kununurra	Ord	Ord River District

**TABLE 2 Sorghum NVT environments (year x location).**

Region	Environments	2017-18	2018-19
Central Qld	4	Capella, Duaringa, Springsure, Clermont	
South Qld	10	Billa Billa, Condamine, Miles, Bongeen, Dalby, Pampas	Billa Billa, Bongeen, Dalby, Pampas
North NSW	7	Bellata, Garah, Pallamallawa	Garah, North Star A&B, Pallamallawa
Liverpool Plains	3	Mullaley, Carroona	Mullaley
Ord	1		Kununurra
<b>Total</b>	<b>25</b>	<b>15</b>	<b>10</b>



**Statistical support.** The design, analysis and interpretation of results were managed by GRDC's Statistics for the Australian Grains Industry (SAGI) project team. The initial analysis of each trait was conducted for each site separately followed by a combined analysis of environments (year by location combinations) over the two summer cropping seasons that were sampled.

**Grain yield.** Trial plots were sown using a precision planter and harvested using small plot headers. The grain yield obtained was converted to tonnes per hectare (t/ha) and adjusted for grain moisture. Predicted grain yield values for selected hybrid sorghum varieties from trials conducted over the summer growing seasons 2017-18 and 2018-19 are displayed in Appendix 1.

**Interpreting results.** Whenever we make a decision, the more information available, the better the outcome. The information presented in this publication comes from the past two seasons and has undergone a rigorous auditing process and statistical analysis. The results represent the environmental conditions experienced but may not be typical of a given region.

A grower must decide the relevance of the past two seasons as compared with the long-term seasonal conditions that might be experienced before selecting any variety in the future. The predictive values of the sorghum NVT results will improve as more trials and more years are added to the sorghum NVT database. When assessing a hybrid's performance, it is imperative to consider the seasonal effects and note the number of comparisons for each hybrid.

Growers are best equipped to interpret these results in relation to rainfall (timing, amount and intensity), temperature (extremes and the length of each event) and local environmental factors that affect a plant's development.

As well as the predicted grain yield values that appear in Appendix 1, another way of viewing a variety's performance is by the NVT Long Term Yield Reporter, which includes error bars – an example of which is provided in Appendix 4. Other regions and variety combinations can be accessed from the NVT website, [www.nvtonline.com.au](http://www.nvtonline.com.au).

**More information.** The full set of parameters that were recorded appear on the website [www.nvtonline.com.au](http://www.nvtonline.com.au).

## Season overview

This guide covers two summer cropping seasons, 2017-18 and 2018-19. The climatic conditions experienced leading up to and during the growing periods varied greatly between and within the five trialling regions. The 2017-18 season began with variable rainfall, which required some sites to be relocated and caused others to struggle.

Cold conditions soon after sowing slowed growth, but temperatures increased to well above average in late December and January. The increased temperature and low rainfall caused some trials to be abandoned and others failed to achieve their target grain yield. Of the 21 trials planned in 2017-18, 15 were deemed suitable to be included in the analysis and fulfilled the NVT testing program criteria (Table 2).

Suitable trial sites were difficult to find for the 2018-19 season, yet 19 of the proposed 22 sites were established. Some sites experienced good in-crop rainfall while others were drought stressed, suffered hail damage or were compromised due to uneven run-off from high-intensity storms. From the 2018-19 trial program, 10 sites were deemed suitable for inclusion in the trial series (Table 2). A summary of temperatures experienced for selected regions appears in Appendix 2, and rainfall received appears in Appendix 3. Information relevant to a specific trial site can be accessed on the NVT website, [www.nvtonline.com.au](http://www.nvtonline.com.au).

## Management

Growers face numerous decisions before sowing and getting each decision correct is important as it will ultimately affect final grain yield and farm profitability. Put simply, "know your paddock", "know your varieties" and "get your timing right". Select paddocks on your farm that meet the requirements of a sorghum crop and fit into the rotations in your farming system. As with any crop, the timing of all operations is essential to success. Monitor the paddock and ensure it remains weed free during the lead-in fallow to maximise stored soil moisture. Aim to achieve a grain protein between 9 and 10 per cent, to maximise grain yield.



# Maturity

Soil temperature has an impact on the time taken for sorghum to emerge and needs to be checked as the sowing date approaches. As a rule-of-thumb, when soil temperatures at sowing depth (approximately 5cm) taken at 08:00 EST are 16°C and rising for at least five days, sowing can commence. Suggested sowing times appear in Table 3.

Sowing date needs to be a compromise that helps combat heat stress during flowering (late December/early January),

the possibility of ergot if temperatures fall below 13°C (from late sowings), and frost affecting seedling emergence (early sowings). Most sorghum hybrids fall into one of the following maturity types: Slow, Medium/Long, Medium/Slow, Medium, Medium/Quick and Quick (Table 4).

The time from sowing to 50 per cent flowering varies between these broad categories and is also influenced by temperature. There may be 7–10 days' difference between time to reach flowering for the same hybrid sown in spring, compared with a summer sowing.

**TABLE 3 Sorghum sowing time suggestions.**

Region	Sowing times by weeks																									
	August				September				October				November				December				January				Feb	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
Central Queensland		C	C	C	C	C	C	C	C	C										C	C	C	C	C	C	C
Southern Queensland						C	C	C	C	C	C	C	C	C	C				C	C	C	C	C			
Northern NSW							C	C	C	C	C	C	C	C				C	C	C	C	C	C			
Liverpool Plains										C	C	C	C	C				C	C	C	C					

C – conventional sowing time

# Variety selection

To manage risk, select at least two sorghum hybrids that possess the traits that will best fit your conditions. This is not a simple exercise and requires steely resolve.

Table 4 lists selected commercially available hybrid varieties with their grain colour, maturity and midge ratings.

**TABLE 4 Sorghum hybrid details.**

Company	Hybrid	Grain colour	Maturity	Midge rating*
Elders	Archer	Red	Medium/Quick	6 (P)
Heritage	HGS114	Red	Medium	6
Nuseed	Cracka	Bright Red	Medium	3
	Rippa	Red	Medium/Long	5
Pacific Seeds	MR-Apollo	Bright Red	Medium/Slow	7
	MR-Bazley	Red	Medium/Quick	6
	MR-Buster	Red	Medium	4
	MR-Taurus	Bright Red	Medium/Quick	6
	Resolute	Bright Red	Medium/Slow	8+
	Halifax	Bright Red	Slow	7
Pioneer	84A66	Bright Red	Medium	7
	84A75	Red	Medium	6
	84G44	Red	Medium	4
	85G33	Red	Medium	6
Radicle Seeds	Agitator	Red	Medium/Quick	4
	Brazen	Red	Medium/Slow	5
S&W Seed Co.	SW Arrow	Red	Quick	NA

\*Midge Resistance Rating. 1 Susceptible, 2 Low, 4 Moderate, 6 Very high, 7 High, 8+ Excellent, (P) Preliminary, NA rating not available

For more information regarding midge resistance ratings contact Tracey Shatte (tracey.shatte@daf.qld.gov.au).

Midge rating is the factor by which a hybrid's midge resistance exceeds that of a fully susceptible hybrid (rating 1). For example, if it is cost effective to control 2 midges/head in a rating 1 hybrid, then cost effective control in a rating 7 hybrid occurs when there are 14 midges/head.

## Row spacing, plant populations and grain yield

Table 5 sets out suggested row spacings based on target grain yield. Wider rows are best suited to lower-yielding environments. An even plant stand is essential, and the final established plant population allows for the maximum use of available subsoil moisture.

Aim to consistently achieve five to six plants/m<sup>2</sup> for good conditions and seasonal outlook, while this population can be reduced to three plants/m<sup>2</sup> for a conservative target and seasonal outlook.

**TABLE 5 Sorghum target grain yield and associated row spacing.**

Target yield	Row spacing width
Greater than 4t/ha	less than or 0.75m, solid
Between 3 and 4t/ha	less than or 1m
Less than 3t/ha	greater than 1m, single or double skip

## Diseases

Major diseases of sorghum are charcoal rot, caused by *Macrophomina phaseolina*, and *Fusarium* stalk rot, caused by two species of *Fusarium*. Both diseases can cause lodging, plant death and potentially significant yield losses.

Ergot can occur at temperatures around 13°C, and high humidity. As such, it is suggested to avoid late season sowings. Infected crops can suffer yield reduction and the ergot honeydew can cause headers to block up, requiring substantial time to clean down.

All diseases pose a significant threat to the Australian grains industry. Growers should monitor all crops and any suspicious lesions should be collected. Keep samples dry, do not wrap in plastic and contact your local Department of Primary Industries representative or agricultural consultant.

## Nutrition

Soil tests should be conducted well before sowing in potential sorghum paddocks to ascertain levels of the major elements, especially nitrogen (N), phosphorus (P) and sulfur (S), as well as the minor element zinc (Zn).

Inadequate levels of the minor elements can affect uptake of the major elements, especially N, which will lower the potential yield of a crop. Apply nitrogen either pre-plant, at sowing or using a split application, before and at sowing.

## Weeds

For effective control of most weeds, apply atrazine either pre-sowing, at sowing or immediately following sowing. Apply metolachlor products as a pre-emergent spray for grass control, especially liverseed grass. Seed should be treated with Concep® seed safener when using S-metolachlor products.

Some hybrids have a phytotoxic reaction to organophosphate (OP) insecticides. This causes symptoms from spotting to intense purpling of leaves and stems.

When crops are likely to be sprayed with OP insecticides, it is suggested to grow tolerant hybrids. Growers should consult relevant seed companies for the latest information on the reaction of hybrids.

## Desiccation

Desiccation is the use of a knock-down herbicide at physiological maturity; that is, when 95 per cent of the grain two-thirds down the southern side of representative heads in the crop have formed a 'black layer'.

Applying the herbicide before appearance of the 'black layer' will result in loss of grain yield, lower test weight and small grain. Harvest should occur around 10 to 14 days after desiccation to prevent losses due to inclement weather and lodging, which can be exacerbated by *Fusarium* infection of the dying plant.

## Insects

**Wireworms.** Both false and true wireworms affect the crop by reducing overall plant populations. Press-wheels and seed treated with a registered insecticide help reduce wireworm numbers and the amount of damage.

**Heliothis.** Heliothis larvae feed on developing grain and need to be controlled when threshold levels are reached. Check the crop either early in the morning or late afternoon at regular intervals of three to four days. Nuclear Polyhedrosis virus application has proven successful and helps to reduce the potential of resistance to pyrethroids and organophosphates developing in the Heliothis population.

**Rutherglen bug.** Rutherglen bug numbers can increase rapidly from flowering to soft dough. As such, aim to prevent large numbers of nymphs developing and affecting the developing grain. Monitor using the same methods as for Heliothis.

**Midge.** Check the midge rating (Table 4) when choosing which hybrid to sow, especially if you are nearing the end of the suggested sowing window. A midge rating greater than 4 is recommended. Newly released hybrids are tested by the Industry Testing Group, comprising DAF Queensland and seed companies, for their midge resistance. Inspect crops about three hours after sunrise during flowering. Control of midge will vary depending on the hybrid's midge rating and the plant population.



## Root lesion nematodes

Sorghum varieties are susceptible to the root lesion nematode *Pratylenchus neglectus*, but resistant to *Pratylenchus thornei*. Test your soil to determine the species and population densities of nematodes present well before sowing by utilising the PreDicta® B testing service.

## PreDicta® B testing service

Growers are faced with numerous decisions before sowing and knowing the disease status of a paddock helps in determining which crop and variety to sow. Guessing a paddock's disease status is dangerous and whenever possible growers should avail themselves of the PreDicta® B testing service. The PreDicta® B soil-testing service quantifies the level of inoculum of several soil-borne pathogens that are common to paddocks in the northern region and can be accessed at [http://pir.sa.gov.au/research/services/molecular\\_diagnostics/predicta\\_b](http://pir.sa.gov.au/research/services/molecular_diagnostics/predicta_b).



# Appendix 1

## Predicted yield values for selected hybrid sorghum varieties in four regions, sorghum National Variety Trials, 2017-18 and 2018-19.

CENTRAL QUEENSLAND		2017-18			
Hybrid	Maturity	Capella	Duaranga	Springsure	Clermont
84A66	Medium	0.318	-0.143	-0.030	0.170
84A75	Medium	0.539	0.200	0.106	0.171
84G44	Medium	-0.319	-0.176	-0.174	-0.057
85G33	Medium	0.493	0.068	0.029	0.245
Agitator	Medium/Quick	-0.414	-0.153	-0.176	-0.177
Archer	Medium/Quick	-0.660	-0.043	-0.063	-0.296
Brazen	Medium/Slow	-0.008	-0.148	-0.131	0.068
Cracka	Medium	0.132	-0.179	-0.028	0.003
Halifax	Slow	-0.031	0.465	0.180	-0.228
HGS114	Medium	-0.166	0.079	0.012	-0.093
MR-Apollo	Medium/Slow	0.351	0.668	0.186	0.073
MR-Bazley	Medium/Quick	0.264	-0.001	0.069	0.162
MR-Buster	Medium	0.540	-0.100	0.044	0.467
MR-Taurus	Medium/Quick	0.417	0.147	0.141	0.264
Resolute	Medium/Slow	-0.025	0.421	0.186	-0.187
Rippa	Medium/Long	NA	NA	NA	NA
SW Arrow	Quick	-0.864	-0.405	-0.150	-0.502
<b>EMY* (t/ha)</b>		<b>2.965</b>	<b>4.398</b>	<b>1.779</b>	<b>2.816</b>
Sowing date		12 Feb 18	09 Feb 18	10 Feb 18	11 Feb 18
Harvest date		22 Jun 18	19 Jun 18	21 Jun 18	06 Jul 18
Days to harvest		130	130	131	145

\*Environment mean yield

SOUTHERN QUEENSLAND		2017-18						2018-19			
Hybrid	Maturity	Billa Billa	Condamine	Miles	Bongeen	Dalby	Pampas	Billa Billa	Bongeen	Dalby	Pampas
84A66	Medium	0.172	0.126	-0.060	0.136	0.063	0.556	0.158	0.109	0.118	0.595
84A75	Medium	0.102	0.095	-0.290	0.731	0.423	1.136	0.026	1.183	0.415	1.427
84G44	Medium	-0.428	-0.250	-0.082	-0.560	-0.651	-0.821	-0.264	-0.940	-0.608	-0.630
85G33	Medium	0.053	0.147	-0.031	0.151	0.002	0.529	0.118	0.254	0.343	0.918
Agitator	Medium/Quick	-0.451	-0.263	-0.081	-0.429	-0.560	-0.603	-0.297	-0.722	-0.744	-0.111
Archer	Medium/Quick	-0.215	-0.171	0.241	-0.572	-0.324	-1.120	-0.152	-0.850	-0.463	-1.224
Brazen	Medium/Slow	-0.319	-0.219	-0.340	-0.097	-0.372	-0.129	-0.248	-0.255	-0.405	-0.063
Cracka	Medium	0.335	0.270	0.292	0.001	0.150	0.581	0.336	-0.080	0.059	0.970
Halifax	Slow	0.021	0.160	0.361	0.271	0.354	0.314	0.063	0.714	0.329	1.307
HGS114	Medium	-0.124	-0.102	-0.043	-0.008	-0.022	-0.239	-0.128	0.035	-0.099	-0.273
MR-Apollo	Medium/Slow	-0.454	-0.135	-0.275	0.494	0.073	0.222	-0.353	1.107	0.436	1.035
MR-Bazley	Medium/Quick	0.284	0.172	0.084	0.091	0.210	0.214	0.218	0.130	0.418	-0.180
MR-Buster	Medium	0.267	0.127	-0.125	-0.057	0.000	-0.069	0.203	-0.182	0.619	-1.164
MR-Taurus	Medium/Quick	0.304	0.229	0.157	0.058	0.222	0.073	0.260	0.165	0.736	-0.399
Resolute	Medium/Slow	0.059	0.095	0.182	0.396	0.448	0.316	0.015	0.858	0.350	0.796
Rippa	Medium/Long	NA	NA	NA	-0.173	-0.195	0.078	NA	-0.065	0.604	1.012
SW Arrow	Quick	0.080	-0.192	-0.020	NA	NA	NA	-0.094	-0.268	-0.925	-0.588
<b>EMY* (t/ha)</b>		<b>2.953</b>	<b>2.879</b>	<b>2.384</b>	<b>6.120</b>	<b>6.302</b>	<b>4.643</b>	<b>2.801</b>	<b>6.194</b>	<b>7.990</b>	<b>6.275</b>
Sowing date		27 Oct 17	24 Oct 17	24 Oct 17	26 Oct 17	10 Nov 17	28 Oct 17	27 Oct 18	28 Oct 18	05 Nov 18	28 Oct 18
Harvest date		12 Feb 18	13 Feb 18	19 Feb 18	02 Mar 18	26 Mar 18	23 Feb 18	18 Feb 19	28 Feb 19	21 Mar 19	21 Feb 19
Days to harvest		108	112	118	127	136	118	114	123	136	116

\*Environment mean yield

The values in the tables are the predicted yield t/ha (variation from the mean) relative to the average-performing variety in an environment. Positive values indicate that the variety performs above the mean yield in the environment (year–location combination) in question. Negative values indicate that the variety performs below the mean yield in the environment in question.

For clarity, the standard errors are not presented in this table but are available in the Long Term Yield Reporter (Appendix 4).

It must be emphasised that the values that appear in Appendix 1 are from only two seasons and should be taken in context. These values may not be representative of the long-term seasonal conditions experienced by growers in the selected regions.

Variation from site mean yield





NORTHERN NSW		2017-18			2018-19			
Hybrid	Maturity	Bellata	Garah	Palla-mallaw	Garah	North Star-A	Palla-mallaw	North Star-B
84A66	Medium	0.220	0.092	-0.060	0.110	0.346	-0.018	0.026
84A75	Medium	0.365	0.203	0.088	0.120	0.519	0.396	-0.244
84G44	Medium	-0.583	-0.368	-0.338	-0.364	-0.578	-0.729	-0.212
85G33	Medium	0.077	0.077	-0.134	-0.114	0.016	-0.144	-0.161
Agitator	Medium/Quick	-0.564	-0.389	-0.307	-0.292	-0.564	-0.617	-0.240
Archer	Medium/Quick	-0.419	-0.230	-0.017	-0.136	-0.611	-0.240	0.138
Brazen	Medium/Slow	-0.283	-0.223	-0.253	-0.209	-0.048	-0.435	-0.304
Cracka	Medium	0.275	0.119	-0.001	0.247	0.180	0.069	0.268
Halifax	Slow	0.010	0.091	0.168	-0.023	-0.491	0.369	-0.045
HGS114	Medium	-0.114	-0.059	0.034	-0.054	-0.125	0.031	-0.061
MR-Apollo	Medium/Slow	-0.295	-0.046	-0.049	-0.477	-0.534	0.029	-0.685
MR-Bazley	Medium/Quick	0.294	0.208	0.116	0.137	0.297	0.209	0.189
MR-Buster	Medium	0.270	0.228	0.010	-0.013	0.458	-0.048	0.131
MR-Taurus	Medium/Quick	0.277	0.271	0.132	0.021	0.142	0.199	0.172
Resolute	Medium/Slow	0.134	0.146	0.260	0.075	-0.161	0.535	-0.018
Rippa	Medium/Long	-0.223	NA	-0.246	NA	-0.761	NA	-0.218
SW Arrow	Quick	0.137	NA	0.231	0.530	0.487	0.392	0.385
<b>EMY* (t/ha)</b>		<b>1.435</b>	<b>1.771</b>	<b>2.181</b>	<b>2.274</b>	<b>1.993</b>	<b>3.391</b>	<b>1.213</b>
Sowing date		17 Oct 17	18 Oct 17	10 Oct 17	27 Oct 18	19 Sep 18	25 Oct 18	13 Nov 18
Harvest date		14 Feb 18	14 Feb 18	23 Feb 18	15 Feb 19	30 Jan 19	14 Feb 19	04 Mar 19
Days to harvest		120	119	136	111	133	112	111

\*Environment mean yield

LIVERPOOL PLAINS		2017-18		2018-19
Hybrid	Maturity	Mullaley	Caroona	Mullaley
84A66	Medium	-0.253	-0.023	-0.256
84A75	Medium	-0.513	0.689	-0.453
84G44	Medium	-0.148	-1.280	-0.247
85G33	Medium	-0.458	-0.114	-0.389
Agitator	Medium/Quick	NA	NA	-0.299
Archer	Medium/Quick	0.501	-0.502	0.468
Brazen	Medium/Slow	NA	NA	-0.493
Cracka	Medium	-0.076	-0.050	0.016
Halifax	Slow	-0.054	0.496	0.200
HGS114	Medium	0.088	0.034	0.074
MR-Apollo	Medium/Slow	-0.616	0.243	-0.482
MR-Bazley	Medium/Quick	0.161	0.527	0.179
MR-Buster	Medium	0.166	0.425	0.065
MR-Taurus	Medium/Quick	0.213	0.702	0.271
Resolute	Medium/Slow	0.082	0.835	0.256
Rippa	Medium/Long	-0.479	-0.467	-0.268
SW Arrow	Quick	NA	NA	0.434
<b>EMY* (t/ha)</b>		<b>5.193</b>	<b>7.907</b>	<b>5.176</b>
Sowing date		25 Oct 17	31 Oct 17	26 Oct 18
Harvest date		19 Mar 18	16 Mar 18	12 Mar 19
Days to harvest		145	136	137

\*Environment mean yield

The values in the tables are the predicted yield t/ha (variation from the mean) relative to the average-performing variety in an environment. Positive values indicate that the variety performs above the mean yield in the environment (year–location combination) in question. Negative values indicate that the variety performs below the mean yield in the environment in question.

For clarity, the standard errors are not presented in this table but are available in the Long Term Yield Reporter (Appendix 4).

It must be emphasised that the values that appear in Appendix 1 are from only two seasons and should be taken in context. These values may not be representative of the long-term seasonal conditions experienced by growers in the selected regions.

Variation from site mean yield

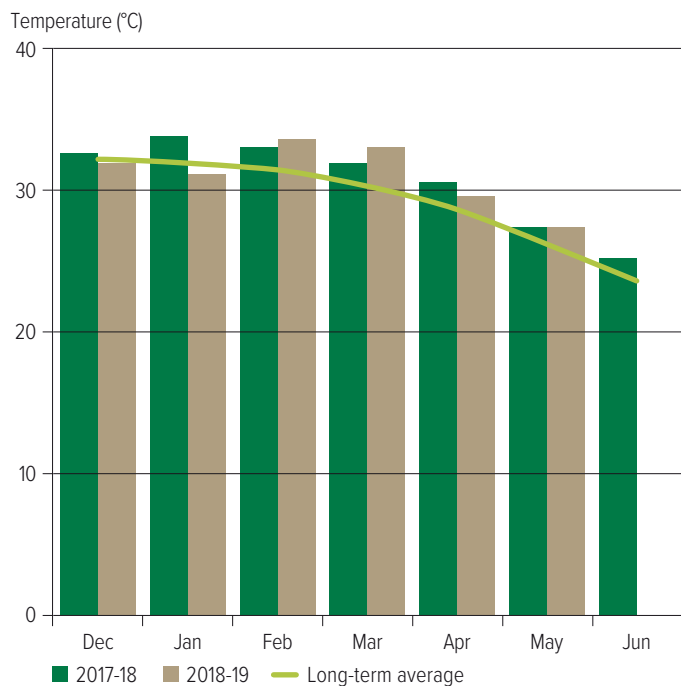


# Appendix 2

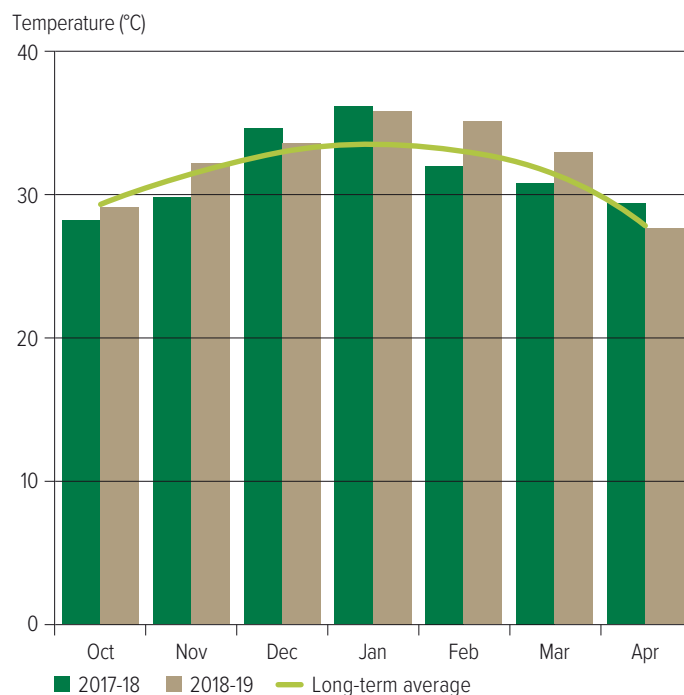
## Temperature summaries for selected regions for sorghum NVT.

Temperature data has been obtained from the nearest Bureau of Meteorology weather station and covers monthly temperature during the growing season.

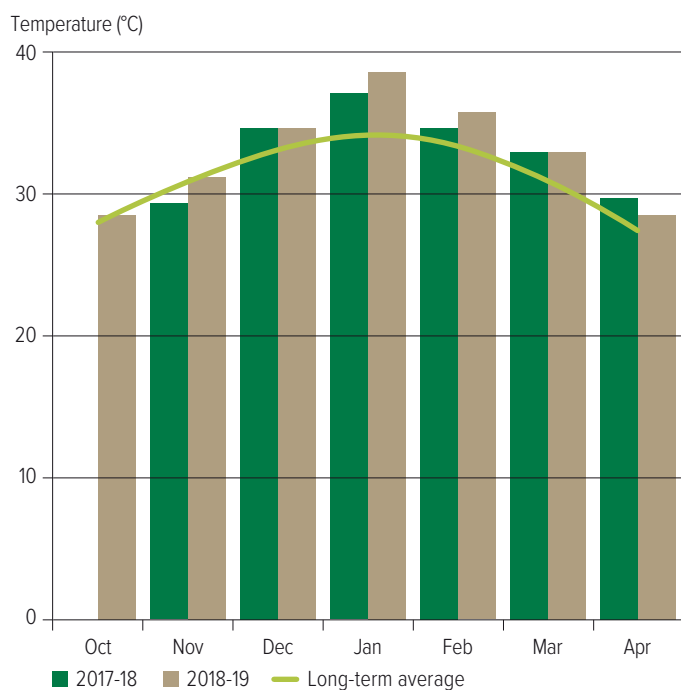
**Central Queensland, Duaringa – mean growing season temperature, Rockhampton Airport**



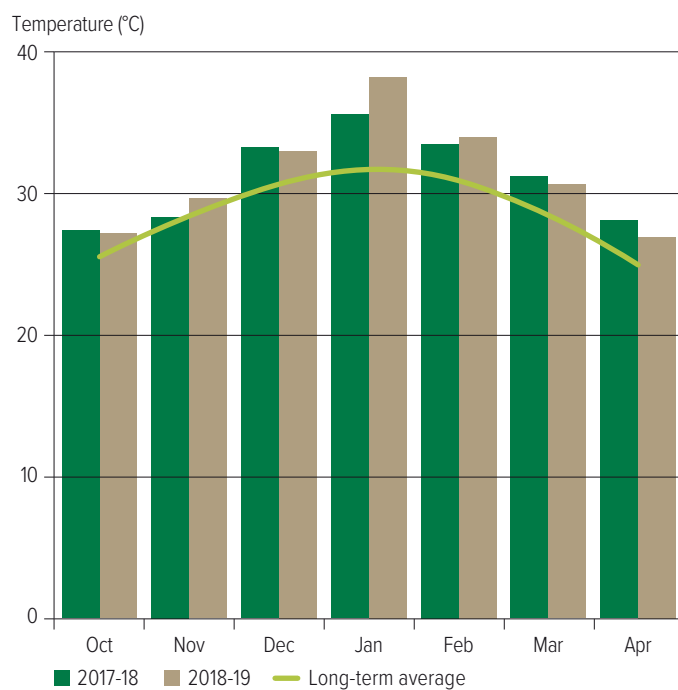
**Southern Queensland, Meandarra – mean growing season temperature, Miles Constance Street**



**Northern New South Wales, Bellata – mean growing season temperature, Narrabri Airport**



**Liverpool Plains, Caroonna – mean growing season temperature, Quirindi Post Office**



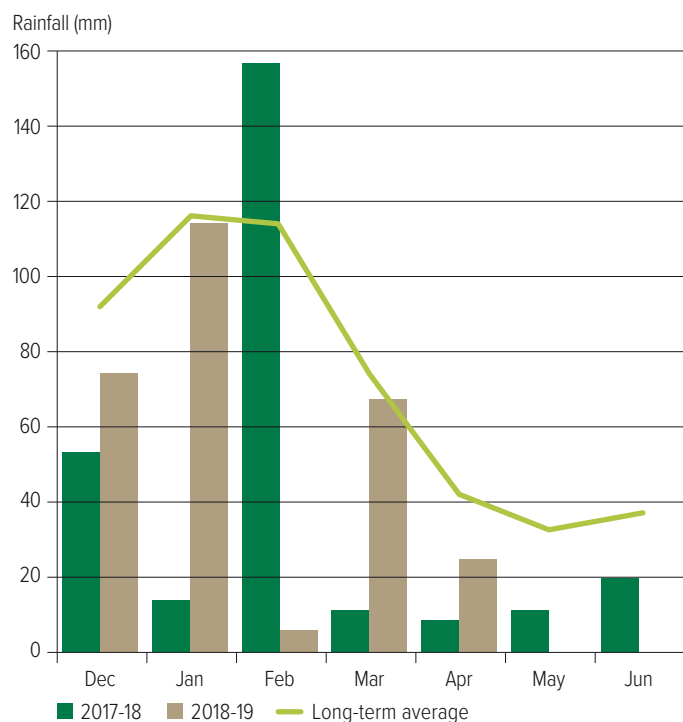


# Appendix 3

## Rainfall summaries for selected regions for sorghum NVT.

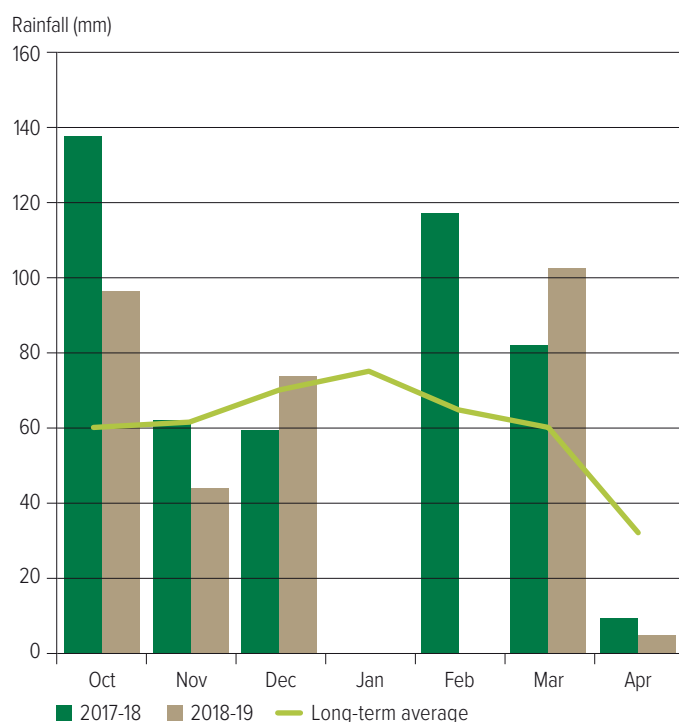
Rainfall data has been obtained from the Bureau of Meteorology and covers monthly rainfall during the growing season.

### Central Queensland, Duaringa – growing season rainfall, Duaringa Post Office

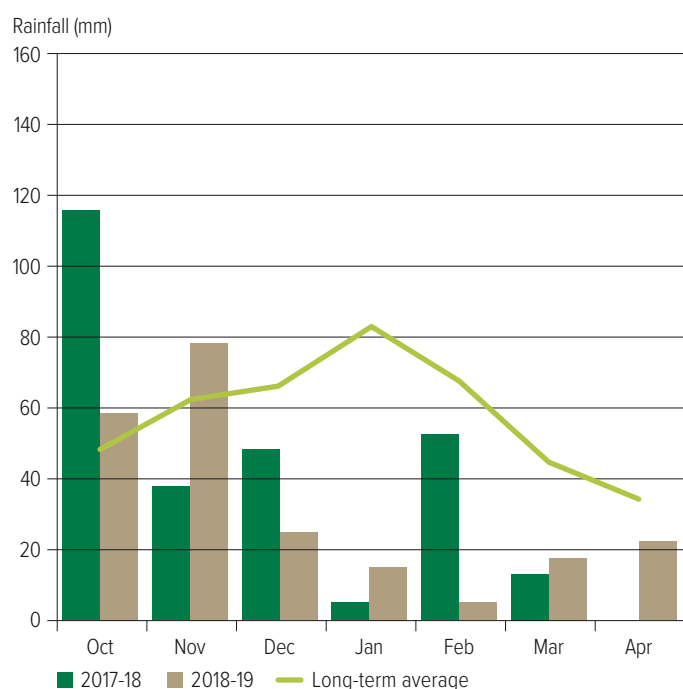


Please note, no values were available for Duaringa rainfall in May and June 2019 at time of printing.

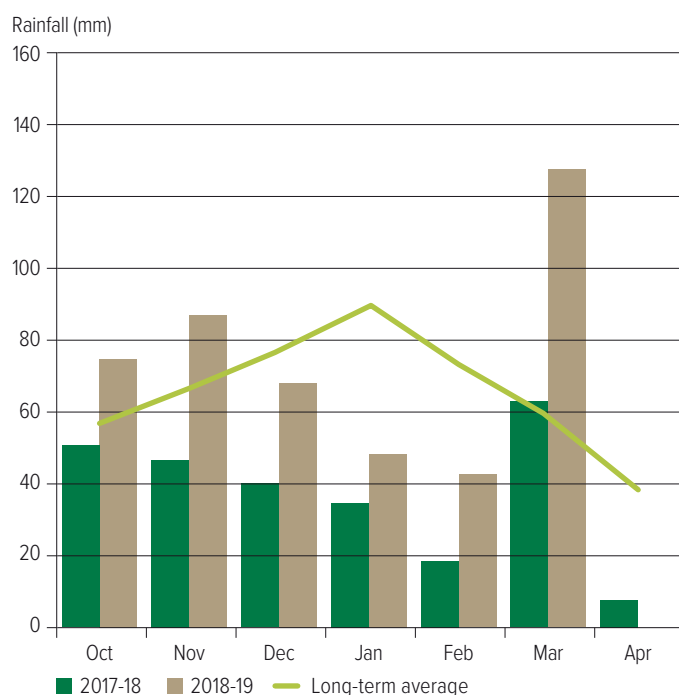
### Southern Queensland, Meandarra – growing season rainfall, Meandarra Post Office



### Northern New South Wales, Bellata – growing season rainfall, Bellata Post Office



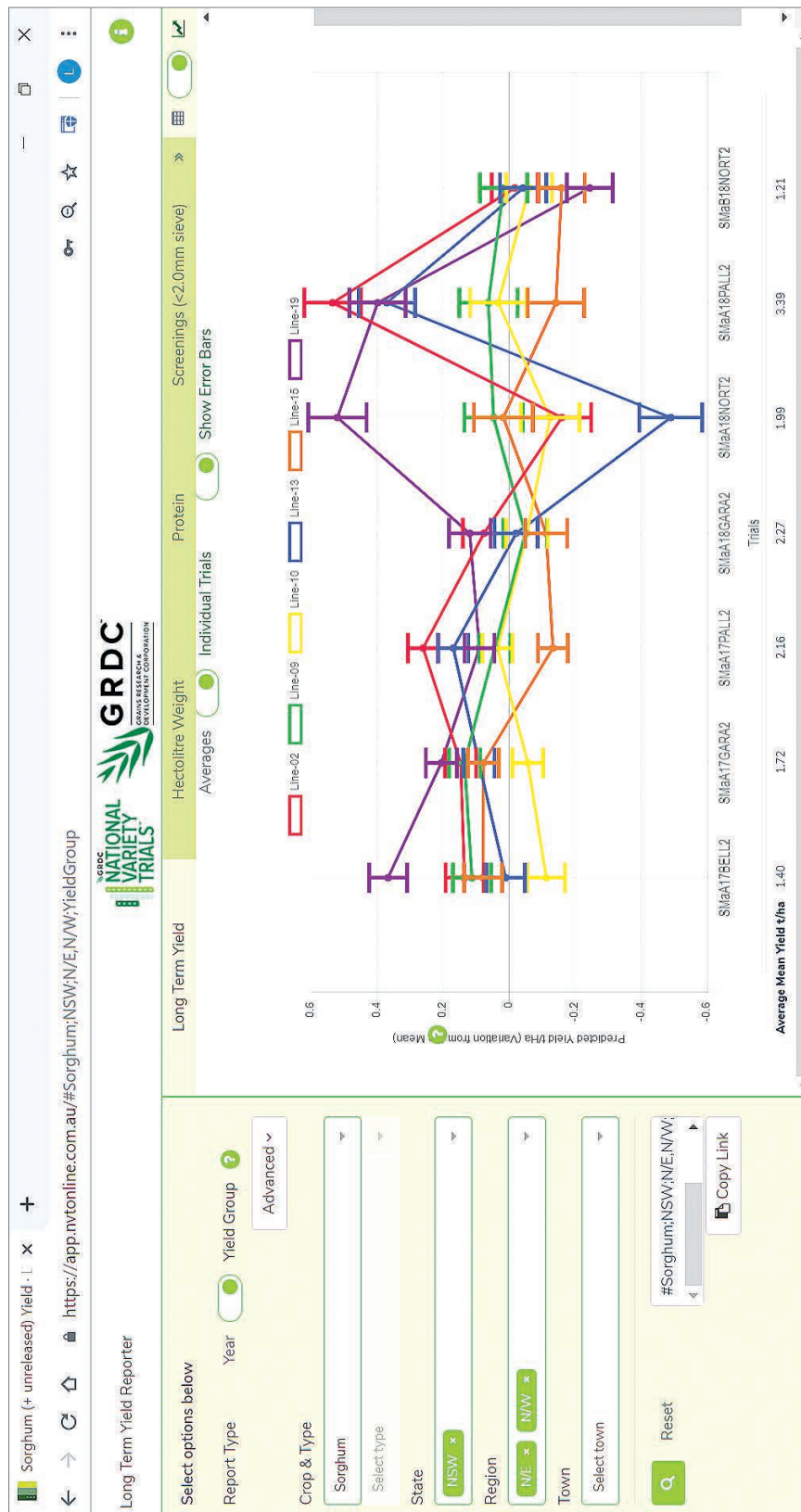
### Liverpool Plains, Caroona – growing season rainfall, Pine Ridge (Billagong)



# Appendix 4

Long Term Yield Reporter showing a selected group of hybrid sorghum varieties in the northern New South Wales region, sorghum National Variety Trials, 2017-18 and 2018-19.

For more detailed sorghum NVT results and to access the Long Term Yield Reporter, please visit <https://app.nvtonline.com.au>





## Notes

[illegible]

# NVTtools

CANOLA | WHEAT | BARLEY | CHICKPEA | FABA BEAN | FIELD PEA |  
LENTIL | LUPIN | OAT | SORGHUM

## Long Term Yield Reporter

New web-based high speed Yield Reporting tool, easy-to-use means of accessing and interpreting the NVT Long Term MET (Multi Environment Trial) results.



## Crop Disease Au App



Access to current disease resistance ratings & disease information.

## Long Term Yield App



Easy access to the analysed NVT Multi Environment Trial (MET) data.