

# Lessons learnt from a dry start

Dale Grey<sup>1</sup>, Ken Solly<sup>2</sup>, Jessica Crettenden<sup>3</sup>, Andrew Ware<sup>4</sup>, Nigel Wilhelm<sup>3</sup>, Amanda Cook<sup>3</sup>, Greg Baker<sup>5</sup>, Helen Brodie<sup>5</sup> and Jacob Giles<sup>4</sup>

<sup>1</sup>Seasonal Risk Agronomist, Agriculture Victoria, Bendigo, <sup>2</sup>Solly Business Services, <sup>3</sup>SARDI Minnipa Agricultural Centre, <sup>4</sup>SARDI Port Lincoln, <sup>5</sup>SARDI Waite

## Introduction

2017 started well with well above average rainfall for January and February, with many growers spraying to control summer weeds and volunteer cereals, to manage insect pests and diseases and conserve soil moisture; thinking we were ready for another good season. However very dry and challenging seeding conditions, with little rain in late April, May and June coupled with low wheat prices, resulted in many growers questioning their management decisions and choices; if, when and how much should they sow? In response to this, GRDC, EPARF and LEADA provided “Dry Start Forums – Maximising returns despite a dry start” in mid-June across the EP. The following article captures some of the lessons learnt in 2017 to potentially help with decision making in future challenging seasons.

## Seasonal climate review of 2017 for Eyre Peninsula - Dale Grey

The 2017 growing season on the Eyre Peninsula was below the average, varying between decile 1 to decile 4, with the majority falling between decile 2-3. Ironically, the season didn't start out like this, with significant summer rain as a result of troughs and cyclonic breakdowns coming in from the north west. Most areas got over 100 mm for summer, which was decile 10. In February, the northern EP had a further 25 mm and this put deep soil moisture over the EP in the rare position of highest 1% of years. March was dry as a cracker. April saw a patchy start to the season where the far NE of the EP had a decile 8 start with

25 mm plus, but the rest of the EP had barely any useful rainfall for crop germination. This continued into May, with nothing of major use falling and June followed up with almost nothing as well. A fair bit of crop had been sown dry by now, but the longer season crops sown two months earlier were not ideal for what turned out to be a late break. Some proportion of the crop had not been sown and the hard decision of whether to pull the pin was being considered. The southern half finally got a start with 50 mm in July and the north got a useful but below average 25 mm. This was followed up by an average to wetter August which finally put the season on the map, with most of the EP receiving 50 mm plus. September “maketh the crop” and it was disappointing. The northern EP struggled for 15 mm and the southern region ticked over with just 25 mm. October was average or below, with the NE corner missing out again. As luck would have it the tap turned on in November, with a decile 8-9 drink of 25 mm. This was too late for some crops, but saved some others. To rub salt into wounds, December was wetter, with the eastern half of the EP getting a harvest interrupting 25 mm.

So what could explain this crazy level of variability? The last time such a poor start occurred was around 1993 and 2017 was the driest ever April-June in some areas of the EP. Other poor starts were as far back as 1930, 1941, 1959 and 1967, so not unprecedented, certainly infrequent, but not in recent memory for young farmers.

The 2016/17 summer experienced higher amounts of low pressure

over SA, indicating favourable conditions for troughing moisture to the south from the tropics. In February the models first started sniffing the possibility of an El Niño in winter. There was a split in the models between a drier and average autumn. The problem with the El Niño prediction was that there were no real indicators in the ocean or the atmosphere that suggested this was possible; the chances looked unlikely. Couple this with the poor performance that most models have in doing autumn predictions and there was no reason to be too defensive in decision making, especially with a deep profile of moisture.

As luck would have it, the random weather conditions in the western Pacific required to start an El Niño failed to occur. By April-May some models started to get off the El Niño horse, but autumn was still dry. The pressure went much higher than normal over SA and a persistent high sat from Perth across to SA, stopping at the Victorian border. This meant that triggers for starting the seasonal break were all pushed south and couldn't get a connection to the good tropical moisture to the north.

By June all models had hopped off an El Niño, but despite this an average to drier outlook for spring prevailed. Things changed for the better in July and August with the ridge of high pressure moving much further north than normal, centred around Coober Pedy, causing the air pressure over southern SA to drop. This allowed frequent fronts and lows through, so connections to the tropics were once again back on.

But unfortunately it stayed this way for September and October, a critical transition time where things need to change from a winter pattern to a summer pattern. Whilst a northern position of the pressure ridge is good during winter, it starts being a problem in spring, as it starts blocking tropical feed from the north. In September a large number of models were gunning for a summer forming La Niña, which has in fact come to pass; but the horse had bolted, as summer La Niña's are very hit and miss as to their rain effects on the EP, and it was too late to be useful if it had been wet.

Now we are in the start of 2018 and there is little guidance from any scientific authority as to what is likely to happen this coming year. Whatever the predictions are in autumn, be very careful about basing too much decision making on them. Take more heed of soil moisture and concentrate on climate forecasts when it gets to July.

### **Farm business management - Ken Solly**

Making decisions in difficult situations with limited precedents is one of the most challenging things that farmers can have to deal with. Experience is not experience until you have experienced it, and most good decisions are built on the back of experience. You can discuss the past until the cows come home but most of the real lessons in life are learned by your eyesight and your bank account.

Many young farmers are well advised to have a good farmer as a mentor who is a generation older, so that s/he can tap into another 20 to 30 years of experience and more importantly wisdom. Younger farmers are well advised to develop an extreme drought plan and do this when times are good. It is only when you are in a positive frame of mind that you can make the best decisions. In

drought you must look after the most important four things on your farm, yourself, your family, your soil and your livestock. In planning for drought it is important that you make sure the decision maker is performing as best s/he can. Droughts pass but the impacts can last for many years. That said I consider it important to plan for a drought after you have had a good year. This will ensure that the available cash is being spent or directed correctly and that you will have sufficient working capital to get through a very bad year. Remember it is a physical drought one year and a financial drought the following year or maybe longer. Tools such as Farm Management Deposits (FMD) can be very useful but this will depend on your tax rate, equity level and other circumstances. If FMD'S can be built to the level of a year's working capital that can take a huge amount of stress out of the system.

It is even more important to have a plan for poor years that contains trigger points for performing certain tasks. Remember the soil is the basis of your business and a failure to take good care of it can have long term ramifications. The most important part of having a plan is that feeling of being in control of things when in fact most are out of your control. Poor management in tough years can affect the performance of the farm for many years to come, so it is important to always have a plan B for everything. Quite often your success is only as good as your back-up plan. Ensure that your plan is written down so you can reference it in the future and remind yourself what worked and what did not for the next time, and there will be a next time. My final piece of advice is to never go into uncharted waters on your own. Always make sure you have a good team around you, a problem shared is a problem halved they say.

### **Livestock - Jessica Crettenden**

In the 2017 season, the majority of regions across Eyre Peninsula experienced a significant period of minimal feed availability for their livestock enterprises, with some areas having to supplementary feed for over half of the year once stubble and pasture resources were depleted. The late 'break' and subsequent lack of natural pasture fodder took many farmers by surprise and the decision of whether to feed, agist and/or sell livestock was, and still is, rather challenging.

Considerable research has been undertaken in mixed farming areas of Australia that have experienced dry seasons and droughts to investigate and understand some of the tactical management options and strategic decisions made by businesses in these situations, and have found that successful livestock farmers;

- Make plans and take action early (decide to feed, agist and/or sell)
- Undertake simple budgets for various feeding and selling options (exit strategies)
- Know their fodder supplies (on hand and what is available, market outlooks)
- Prepare cash-flow budgets for their livestock enterprises for up to three years
- Reviewed decisions regularly, assessed risks and looked for opportunities.

Optimistically, farmers have learnt from this past season that flexibility is particularly important in livestock enterprises, as many different factors can influence business and operational decisions rapidly. Consequently, it is essential to understand how to manage livestock nutrition, reproduction, health and husbandry and flock/herd structure according to the current environment and market outlooks.

Decisions can be complex when operating a mixed farming system, which many businesses on Eyre Peninsula would have observed over the past year, however this can also present more opportunities, such as the chance to graze failed crops or obtain cheaper supplementary feed for the livestock enterprise if seasonal and market conditions do not prevail for the cropping enterprise. In the 2017 harvest, some mixed farmers made the decision to hold onto some of their grain for feed due to poor grain prices and positive livestock market outlooks. Farmers who also did this after the 2016 harvest avoided having to pay high prices for supplementary feed in autumn when their on-farm stocks ran out, as others across the state were trying to source similar commodities.

Having enough supplementary feed on-hand for a minimum of two seasons is a lesson that most livestock producers should now understand and having a flexible business plan for their farming systems to cater for the variable environmental conditions is an essential measure for the successful productivity and profitability of the enterprise.

Other useful articles in the Eyre Peninsula Farming Systems Summary 2017 are *Sheep health issues in dry seasons*, and *Livestock supplementary feeding in mixed farming systems*.

### **Cereal selection - Andrew Ware**

The delayed start to the season in 2017 left many wondering if they should have a short season variety available in the silo, ready if similar conditions ever repeated themselves. The 2017 NVT trials and how their performances related to long term averages may provide some answers.

NVT trials in 2017 generally yielded lower than in the previous

five seasons (averaging 1.3 t/ha across seven upper Eyre Peninsula sites). While some variability occurred between sites, when averaged across all upper EP sites, Scepter was the highest yielding entry, yielding 109% of the site mean yield. This was followed by Gladius, Mace, Trojan, and Axe yielding between 103-104% of site mean yield as the next highest yielding milling wheat varieties. Scepter's good relative performance in 2017 matches long term yields that show Scepter to be the highest yielding wheat variety across a wide range of yield environments in South Australia.

Only one NVT barley trial on upper Eyre Peninsula (Elliston) performed well enough to be released in 2017. Trials at Minnipa and Darke Peak had a number of plots that weren't able to be harvested due to varieties dying early and not being able to head. Observations of these trials showed that varieties such as Fathom, Hindmarsh, La Trobe, Spartacus CL, Scope, Rosalind and Compass all visually appeared to head well, however some of the European introduced varieties such as RGT Planet had largely died before heads had emerged.

Dry sowing, in general terms, proved a reasonably successful approach with cereals in 2017. While many growers that tried this practice reported lower than normal establishment, generally establishment still remained acceptable and these paddocks yielded higher than crops that were sown after the break to the season. Dry sown field trials conducted on lower EP found that increasing seeding rate did not significantly improve yield. Careful consideration of weed and mouse control was needed and patchy establishment on small rainfall events resulted in an unsightly range of plant growth stages across the paddock during the growing season.

### **Nutrition - Nigel Wilhelm**

One of the most vexing issues with managing the nutrition of broad-acre crops is that if nutrients additional to the soil supply are needed for a productive and profitable crop, they are best applied early in the crop's development, as early as seeding. This means that the majority of fertiliser investments are made early and committed to paddocks before any reliable signals of seasonal outlook are present. As you all know, there are always exceptions in agriculture, and foliar sprays of trace elements and mid-season spreading of N before the next rain are two obvious ones. However, in general supplementary nutrients applied at seeding give the best return on investment.

In years like 2017 with such a horrible start, and for many areas also a horrible finish, it is natural to be anxious about the value of all the fertilisers applied at seeding. While it is true that if the crop never gets the chance to perform well due to ongoing dry conditions, then the cash return to those fertilisers in that year is likely to be small or negative. But all is not lost. Under dry conditions, crops are more dependent on fertiliser nutrients than those in the soil because often they are close and readily available and thus easy for the crop to access. Another positive aspect is that unless the soil blows away, those fertiliser nutrients will not be lost to the paddock. They will contribute to the performance of crops in following years, so some of the fertilisers applied in a very dry year become an investment in the performance of those following crops. This happens a lot with P but even very soluble and mobile nutrients like bagged N will carry over from one year to the next, especially after very dry years.

This means that fertiliser rates in the year following a dry season can be discounted because of extra carry-over from the poor year prior.

In the higher rainfall areas, which often have to use a combination of nutrients applied at seeding and during the season to achieve the rates required to satisfy high yielding crops, farmers already have some wriggle room built in to adjust rates for poor outlooks. The amounts applied at seeding are committed very early in the programme but mid-season “top-ups” can be adjusted to current conditions and seasonal outlooks. Preserving this mix of seeding and midseason applications (e.g. 60:40 split of seeding and midseason for N) is a valuable risk management tool.

### **Weeds and herbicides - Amanda Cook**

The dry seeding conditions and lack of rainfall at the start of the 2017 season resulted in challenging conditions for both establishing crops and achieving weed control. There was little herbicide activity especially for those herbicides which rely on soil moisture and soil mobility for grass weed control. Barley grass generally all germinates in the following season, however in drier conditions the germination is lower as the seed does not have enough moisture to imbibe and germinate. Also grass weeds which set seed in cool mild spring conditions like 2016 generally have higher seed dormancy (Preston, 2017 Kimba GRDC Update).

Increased seed dormancy in cropped paddocks is also resulting in barley grass germinating later, which limits early grass control with pre-emergent herbicides. Reducing the weed seed bank is pivotal in managing all grass weeds so effective two year breaks during the pasture/break crop phase is important in paddocks

with high grass weed numbers to reduce the grass weed seed bank. Using integrated weed management strategies such as crop competition is important to reduce weed numbers and the weed seed bank.

In 2017 at MAC, dry sowing on 26 April (TOS 1) in the herbicide efficacy trial resulted in significantly lower plant numbers due to seedling deaths with only 70 plants/m<sup>2</sup> after eight weeks of very dry conditions, compared to 30 May TOS 2 with 112 plants/m<sup>2</sup> after four weeks of dry conditions, and 10 July TOS 3 with 113 plant/m<sup>2</sup> sown into moist conditions. The earlier TOS 1 had higher weed numbers earlier in the season (26 barley grass/m<sup>2</sup>) and lower crop establishment resulting in lower grass weed competition and greater barley grass weed seed set. In 2017 in extremely dry conditions and in a heavy soil type, the earlier TOS 1 (0.37 t/ha) did not result in higher grain yield compared to TOS 2 (0.49 t/ha). Sowing late into adequate moisture (TOS 3) resulted in very low grass weed numbers, average 4.5 barley grass/m<sup>2</sup> and low weed seed set, however there was a yield penalty (0.43 t/ha).

Hopefully the 2017 seeding conditions won't be repeated and due to the very low rainfall in May and June may be one of the few times early sowing did not increase grain yield. Earlier sowing did result in higher numbers of grass weeds compared to later sowing.

### **Russian Wheat Aphids - Maarten Van Helden**

In 2017 the Russian Wheat Aphid (RWA) was found all over the Eyre Peninsula. SAGIT funded research done by SARDI Adelaide showed that this aphid prefers drier climates, and especially drought stressed young cereals. Autumn populations in (low rainfall) Loxton were 4-5 times higher than in medium and high rainfall areas!

RWA survives the summer mainly on volunteer cereals. It is often very easy to find in a paddock if there is some re-growth. Wild grasses (native or exotic) do not seem to play a major role for over-summering. Avoiding this ‘green bridge’ is important and this requires these plants to be killed at least 2 weeks before sowing, either by spraying, grazing or tillage. Cereals sown in April and early May seem to have a slightly higher risk of RWA colonisation. Fortunately, well-established crops (GS>35) seem no longer attractive for the aphid in spring. Little or no yield loss was observed in our trials on crops sown in mid-May.

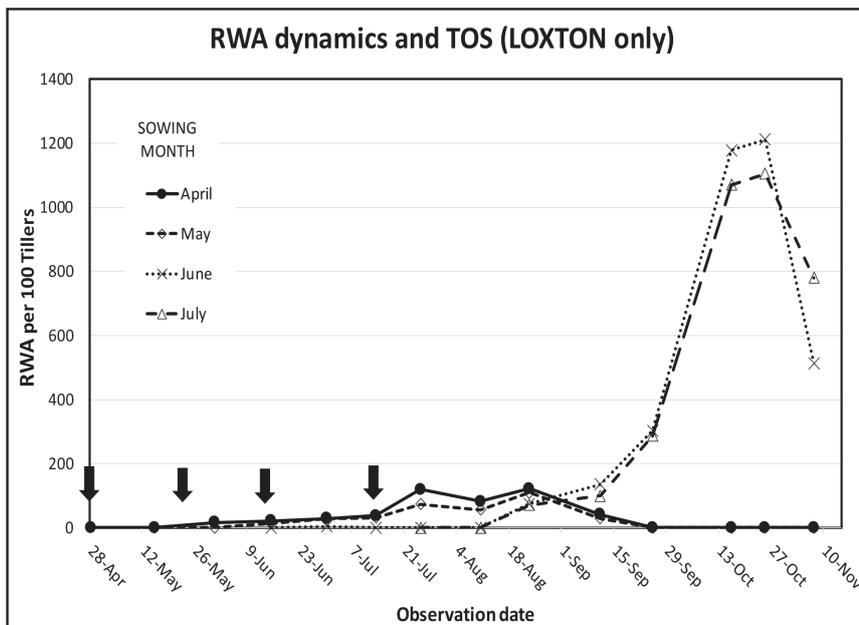
Neonicotinoid seed treatments prevented aphid infestation in April and May sown crops, but some symptoms can still occur due to aphid probing. Over time the seed treatment wears off, but the bigger plants are no longer attractive.

Results however showed that sowing too late (June) is an even greater risk since RWA migration started in August, and young crops were very susceptible (Figure 1). Aphids probably built up in autumn on wild weedy grasses such as barley-grass and then migrated when these matured in August. So crops that are still at a vulnerable growth stage (GS<30) in August seem to be at high risk of RWA damage.

### **Snail management - Greg Baker, Helen Brodie and Jacob Giles**

The pre-season weather conditions and the timing and ‘decisiveness’ of the season break can influence the effectiveness and choice of snail management tactics.

Under a dry start there are several potential benefits for snail control. Firstly, a higher aestivation mortality may result from the greater dehydration in an extended dry and hot summer-autumn period.



**Figure 1. RWA dynamics and time of sowing in Loxton 2017. Arrows indicate sowing dates.**

Also, a reduced green-bridge may provide less refuge and less chance for snails to revive and rehydrate during this period.

Secondly, there may be better opportunity to burn heavily-infested paddocks because the dry period may extend beyond the fire ban period.

However, a dry start also poses some potential disadvantages for snail management. Firstly, there are likely to be fewer good opportunities to bait early. Delayed rainfall is likely to limit the periods of early-season snail activity suitable for baiting. This increases the likelihood that baiting may not take place until cold 'winter' temperatures have set in, which reduces baiting effectiveness. If a grower is tempted to bait during an extended dry period, on the off-chance that it might rain, the baits are likely to be degraded under warm temperatures and hence may have lost their effectiveness when snail activity does commence.

Secondly, the staggered timing of snail activity (movement, feeding and egg laying) as a result of smaller, inconsistent rain events may require more repeated baiting applications to achieve good control.

Thirdly, a flow-on effect of late sowing may mean that crops mature later. Hence near to harvest snails may be less inclined to respond to light dews or rains that would otherwise result in them descending temporarily from standing crops. This may cause more snail contamination at harvest.

### General recommendations for effective snail baiting

Irrespective of the timing of the season break, the primary factors for effective snail bait application are a) a high level of snail activity and feeding at the time of baiting, and b) an adequate rate of bait application. Both must be achieved to ensure a high chance of bait encounter and a good baiting kill.

Autumn is the ideal time to bait snails and ensure good kill before egg laying has commenced. Baiting after egg laying has started will be less effective, because reducing the juvenile population is more difficult, newly germinating weeds and crop plants distract snails from baits, and lower temperatures often associated with later baiting reduce bait efficacy.

In a dry start we recommend to continue to monitor snail activity and bait when weather conditions have triggered sufficient snail movement and feeding activity to ensure good bait encounter.

### What have we learnt?

- Summer weed spraying to conserve soil moisture made a very important contribution to crop yields.
- Across all upper EP sites, Scepter was the highest yielding entry, yielding 109% of site mean yield followed by Gladius, Mace, Trojan, and Axe yielding between 103-104% of site mean yield.
- Make a business plan for tough times during the good times, and have a good team to help make the decisions.
- For some businesses making the decision not to crop was the right one (even though it's a very hard decision).
- Putting some grazing cereal in early and having adequate feed on hand is very important.
- Containment feeding is important to keep livestock off vulnerable paddocks
- Under dry conditions, crops are more dependent on added fertiliser nutrients than those in the soil as they are close, readily available and easier for the crop to access. Providing the soil does not blow away, fertiliser nutrients will not be lost to the paddock and most will be available for future crops.

