Welcome to the 2015 autumn edition of CaneConnection. In this edition we provide updates on preparing your land for planting, variety selection, effective billet planting techniques, weed control, herbicide resistance and the benefits of good drainage to minimise yield loss and environmental impacts.

In March, SRA welcomed Belinda Billing as the new Development Officer for the Burdekin based in Ayr. Later in this edition you will find out about Belinda’s role collaborating with industry groups to promote outcomes from research projects.

SRA invests approximately $16 million annually on research aimed at increasing the productivity and profitability of the Australian sugarcane industry. Productivity service groups have a key role in extending SRA research information with growers. Practical on-farm extension is the best way to demonstrate the benefits of new research or long-standing farm management techniques. Under a pilot program, SRA is funding several projects to show the value of new farm techniques and technology. In this edition you will learn about a drainage project being coordinated by Mulgrave Productivity Services involving four growers to investigate the value of laser levelling of blocks to improve drainage of surface water.

A skilled advisory sector is critical to our industries future prosperity. To further the skills of our extension providers, SRA have conducted a number of training activities over recent months including a three day ‘New Advisors’ training course held in February focusing on our next generation of advisory staff.

This was followed up with two training courses held at our Woodford Research Station in early March, focusing on the important area of disease identification and management. These were delivered at an introductory and advanced level catering for all levels of experience amongst our advisors. When combined, the three courses were attended by over 60 agribusiness, Productivity Board and Research staff.

Cane showing symptoms of Yellow Canopy Syndrome (YCS) continues to be observed from Mackay to far North Queensland. The SRA Board received an update on the YCS program from the independent Chair of the Scientific Reference Panel Professor John Lovett at our recent Board meeting. The Board approved additional funding for the current program and remains committed to finding solutions to YCS.

The next YCS newsletter, to be distributed to growers in April, will provide a progress report on key research activities. In the meantime, SRA’s Development Officers are on hand to provide growers with YCS updates and news.

If you have any ideas for future topics or suggestions on how to improve CaneConnection, please email us: communications@sugarresearch.com.au

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Choosing varieties to reduce risk of disease

Apart from selecting new varieties for high yield and CCS, there are two other major considerations for a grower to address when making these decisions:

1. How much risk does my farm have from relying too much on one or two varieties?
2. Which varieties have resistance to diseases prevalent in my region?

Over-reliance on one variety is risky

A grower’s variety selection plays an important role in improving productivity and managing the risks of disease epidemics. The Australian sugarcane industry has experienced frequent disease epidemics that have been associated with the over-planting of one variety on individual farms.

When one variety has significantly better productivity than others, growers make a decision to accept the risks associated with over-reliance on this variety to reap the gains from the extra productivity. However, over time, diseases can reappear or transform into new strains.

Together with exotic pests, they can have a devastating impact on yields when farms or regions are dominated by one variety. Past epidemics have included:

- **Fiji leaf gall**, which reappeared in the Bundaberg/Isis region in 1969 after it was thought to have been eradicated from Queensland.

It spread into NCo310 in the southern and central districts when NCo310 comprised more than 70 per cent of the crop.

- **Brown rust** was found in Australia for the first time in 1978 and was previously an unidentified disease.

- **Pachymetra root rot** was discovered in north Queensland in the late 1970s. Q90 became a major variety in north Queensland in the 1980s and was vulnerable to both brown rust and pachymetra disease. When these two diseases attacked Q90 in that region, 90 per cent of the crop was affected and profits plunged.

- **Orange rust**, a disease thought to be of no economic importance, devastated Q124 in 2000 when that variety was 87 per cent of the crop in the central region, and 60 per cent of the crop in the Herbert and southern regions.

- **Sugarcane smut**, found for the first time in Queensland in 2006, has rapidly spread to all regions where it has attacked many widely grown varieties such as Q157, Q166, Q174, Q205, Q207 and Q209. In most regions in 2006, smut-susceptible varieties contributed 70–80 per cent of the crop.

Why it’s important to assess your farm’s risk of disease

Growers should be aware of the diseases that could strike your cane. Diseases that reduce yield will lower profit. Some, such as Pachymetra, have contributed to industry-wide losses of 15–35 per cent, depending on the level of the disease and the resistance of the commercial varieties grown (Magarey et al., 2002). In some cases, variety selection can manage disease impact and reduce overall cane losses. The SRA breeding and selection program has a strategy for developing varieties that have resistance to some diseases. The diseases that can be managed by growing resistant varieties are listed below.

<table>
<thead>
<tr>
<th>Leaf diseases</th>
<th>Whole-plant diseases</th>
<th>Soil-borne diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown rust</td>
<td>Chlorotic streak</td>
<td>Pachymetra root rot</td>
</tr>
<tr>
<td>Orange rust</td>
<td>Fiji leaf gall</td>
<td></td>
</tr>
<tr>
<td>Yellow spot</td>
<td>Leaf scald</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mosaic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sugarcane smut</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Sugarcane diseases that can be managed by choosing the correct variety.

QCANESelect™ has a whole-farm plan section that can help growers determine their current variety mix and disease risks associated with the current mix of varieties. It also helps growers develop a plan to manage risks from diseases by selecting varieties that will maximise profit but have risk profiles set by the grower. Contact Roderick Fletcher at rfletcher@sugarresearch.com.au for more information.
Herbicide resistance has not yet been identified on any sugarcane farm.

However, some of the weeds that have evolved resistance in other Australian cropping systems are also present on sugarcane farms, most notably awnless barnyard grass (Group M resistance), barnyard grass (Group C resistance), common sowthistle (Group B resistance), fleabane (Group M resistance), square weed (Group L resistance), and wild radish (Groups B, C, F and I resistance).

Overseas, crowsfoot grass, which is very common on our sugarcane farms, has developed resistance to seven herbicide modes of action (Groups A, B, C, D, L, M, and N).

Target site resistance

This is where weeds overcome the specific mode of action. For example, glyphosate (a Group M herbicide) works by inhibiting the EPSP synthase pathway in plants. EPSP enzymes help in the production of certain amino acids that are essential for plant growth. When sprayed with glyphosate, plants are unable to make pigments and other metabolites and subsequently die.

Plants can evolve to overcome glyphosate's inhibition of EPSP synthesis by different methods:

- genetic mutations within the EPSP enzymes, or
- gene amplification whereby the weed produces more EPSP enzyme than can be 'taken out' by the glyphosate.

The mechanism used depends on the weed species.

Target site resistance is associated with high herbicide application rates and the mechanisms involved in resistance evolution are well researched and understood by scientists.

Non-target site resistance

This type of resistance is much less understood but there is a lot of work going on globally to understand the way weeds evolve non-target site resistance. This type of resistance is potentially scarier because it allows weeds to develop resistance to herbicide groups that they have never been exposed to. It also allows for development of resistance against multiple modes of action.

Non-target site resistance is also called ‘metabolic’ resistance because through various ways the weed de-toxifies the herbicide before it reaches the herbicide’s target site within the plant.

Globally, herbicide resistance in weeds is one of the major threats to crop productivity. In Australia, around $34 million will be spent on broad-acre, crop-protection research and development in 2014-2015, with most of it on weed-resistance management issues (GRDC Stakeholder Report 2014-2015).
The rate of evolution of metabolic resistance can be increased by using low rates of herbicides. In grains, this type of resistance is particularly important for pre-emergent herbicides. Pre-emergent herbicides break down over time, meaning that weeds germinating late after application are exposed to lower doses of the herbicide.

Researchers at the Australian Herbicide Resistance Initiative (AHRI) have shown that a small percentage of a weed population can survive this lower concentration by metabolising the herbicide. These resistant survivors then go on to reproduce and become dominant in the weed population.

**What does this mean for sugarcane?**

Experience in other cropping systems shows that resistance to herbicides can evolve, regardless of the herbicide rate used. However, using a robust application rate is likely to slow down the evolution of metabolic resistance (the more insidious type of resistance as it can lead to multiple resistance, including to herbicide groups that weeds have not been previously exposed or built resistance towards).

Rotation of herbicide groups in grain has helped but has not prevented resistance evolving. Non-herbicide weed control has proven to be an essential component of weed management in the grains industry’s war on resistant weeds.

Rotation of herbicide groups in grain has helped but has not prevented resistance evolving. Non-herbicide weed control has proven to be an essential component of weed management in the grains industry’s war on resistant weeds.

**The lessons for us in sugarcane, especially when we move into genetically modified herbicide-tolerant varieties, are:**

- Understand where your weed problem is coming from – on-farm soil weed seed banks, introduced by floodwaters and on-farm machinery (especially harvesters).
- Don’t rely solely on herbicides.
- Rotate herbicide groups, but change the sequences of rotation over time (e.g. don’t always follow glyphosate with paraquat).
- Use herbicides as per label instructions.
- Prevent seed set on weeds, thereby reducing the weed seed population.
- Take measures to prevent weed seed introduction onto the farm (e.g. machinery wash-downs, restricted movement of visitors’ vehicles, harvester blow-downs).

If you are interested in learning more about herbicide resistance in Australia visit [glyphosateresistance.org.au](http://glyphosateresistance.org.au) or view the AHRI website [ahri.uwa.edu.au](http://ahri.uwa.edu.au)
Planting is a major cost to the Australian sugarcane industry. It is important to get good plant establishment as it affects your ongoing returns through the crop cycle.

Is billet quality costing you?

Careful attention to the many components of the billet planting system should ensure a successful strike.

For optimal germination rates, the following items need to be assessed:

- Seed cane quality
- Harvester set-up to minimise damage
- Planting rates
- Effectiveness of fungicides
- Placement of billets
- Press-wheel set-up.

Seed cane quality

Growers should plant only good-quality, disease-free cane from an approved seed source. Ensure that you plan ahead by:

1. Determining the varieties and volumes of cane required for planting.
2. Grow cane specifically for plants. Cane should:
   - Be erect with short internodes; achieved through reduced fertiliser rates.
   - Have at least two buds per sett.
   - Be less than one year old.
   - Be no more than three years off hot-water treatment.

Note: Approved seed is already one year off hot-water treatment when purchased. New approved seed should be introduced onto the farm at least every second year.

Harvester set-up for cutting good-quality billets

For billet planting, it is best to use a modified harvester to cut undamaged billets between 250 and 300 mm long. Samples of planting billets should be taken and inspected for split or crushed ends and damaged eyes.

Many commercial cane harvesters have variations in feed-roller speeds and aggressive ‘teeth’ on rollers. This causes highly variable billet length and damage to eyes, which in turn will reduce germination rates.

Modifications, such as rubber coating rollers and feed-train optimisation to match all roller speeds to chopper speed, can significantly improve the quality of planting billets.

Quality assessments to determine the quantity of viable billets have shown:

- Whole stick planter – 80 per cent viable billets
- Modified harvester (optimised/rubberised rollers) – 70 per cent viable billets
- Commercial cane harvester – 30 per cent viable billets or less.

Cutting lodged cane for plants significantly reduces the level of viable billets, even with a fully modified harvester. It is also important to reduce speed when harvesting for billet planting. This minimises trash levels and avoids overloading the choppers, which can cause billets to become squashed on the ends and split.

Figure 1: Good-quality billets.

Figure 2: Poorly cut billets.
Planting rates

The target planting rate is four to six eyes per metre to establish three primary shoots per metre. Key points to remember for planting rates include:

• Higher planting rates will not guarantee a suitable plant stand.
• Excessive tillering may mean unnecessary use of nutrients and moisture.
• For lower planting rates, good-quality billets are essential.
• Assess the number of viable eyes prior to planting to ensure a good strike.
• An even feed of billets is needed, with no gaps.

Increasing the amount of cane (depth of cane) covering the elevating slats will increase the billet metering rate.

While billet planters don’t have a consistent metering system, it is important to ensure that the depth of cane remains constant, which will allow for a more even billet distribution.

Calculating planter output (t/ha)

Step 1

Run the planter over 10 metres, collect the billets and weigh.

Step 2

\[
\frac{\text{Sample weight (kg)}}{10} \times \frac{10,000}{\text{row spacing (m)}}
\]

1000

Effectiveness of fungicides

Effective fungicide application is necessary to prevent Pineapple sett rot. Billets must be cleanly cut and protected with an appropriate fungicide such as Shirtan, Tilt, or other cane sett treatment.

Planters that use fungicide sprays must be correctly set up to ensure that both ends of the billet and any growth cracks on the billet are covered. If there is insufficient coverage, check nozzles for correct positioning and ensure there are no nozzle blockages. If the planter uses a dip for fungicide application the dip must be kept clean. Mud in the dip will reduce the effectiveness of the fungicide.

Pineapple sett rot is caused by a fungal infection that is favoured by planting damaged billets and/or cold, dry or wet soil conditions.

Placement of billets

The amount of soil cover over the sett, soil temperature, and moisture content influence the speed of germination. With good soil moisture, 25 to 50 mm of firmed soil is sufficient coverage.

Press-wheel set-up

Correctly set press-wheels enhance crop establishment. It is best to use large diameter pneumatic wheels, with wheel width matched to the planting furrow width. Significant press-wheel forces are required to create adequate sett-to-soil contact. Down force should be in the range of 2 to 4 kg per cm of wheel width. For example, for a 15 cm wide press-wheel, down force should be in the range of 30 to 60 kg. This can be easily checked using bathroom scales.

Further information

For more information please refer to the SRA information sheet Billet quality – a key element for planting success and the SRA CaneClip Billet quality – a key element for planting success from the SRA website sugarresearch.com.au
Early planting in autumn has been shown to be one of the keys to growing higher yielding plant cane crops. Trial work in the Burdekin and analysis of mill data from various regions demonstrate that yields were up to 42 t/ha higher when cane was planted in autumn compared to cane planted in spring.

Burdekin trials compared the yields for plant cane with three planting dates: in April, August and October. All treatments were harvested at the same time in the following year. The cane planted in April yielded 133 t/ha, the cane planted in August yielded 106 t/ha, and the cane planted in October yielded 91 t/ha. In this trial a yield increase of 42 t/ha was achieved through early planting.

Result of the Burdekin planting date trial

<table>
<thead>
<tr>
<th>Planting date</th>
<th>April</th>
<th>August</th>
<th>October</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cane yield t/ha</td>
<td>133</td>
<td>106</td>
<td>91</td>
</tr>
</tbody>
</table>

An analysis of mill data from the Bundaberg and Burdekin regions shows similar trends, with the yields of early-planted cane being significantly higher than late-planted cane. The two tables below show the yields for plant cane with various planting dates. This data has been generated from aggregated mill supply data for each of the regions.

Mill yield data from the Bundaberg region—tonnes of cane harvested per hectare for various years

<table>
<thead>
<tr>
<th>Class</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn plant</td>
<td>115</td>
<td>123</td>
<td>119</td>
<td>119</td>
<td>112</td>
<td>118</td>
</tr>
<tr>
<td>Spring plant</td>
<td>94</td>
<td>94</td>
<td>76</td>
<td>95</td>
<td>84</td>
<td>89</td>
</tr>
<tr>
<td>Spring replant</td>
<td>91</td>
<td>90</td>
<td>63</td>
<td>88</td>
<td>66</td>
<td>80</td>
</tr>
<tr>
<td>Autumn plant increase over replant</td>
<td>24</td>
<td>33</td>
<td>56</td>
<td>31</td>
<td>46</td>
<td>38</td>
</tr>
<tr>
<td>Autumn plant increase over spring fallow plant</td>
<td>21</td>
<td>29</td>
<td>43</td>
<td>24</td>
<td>28</td>
<td>29</td>
</tr>
</tbody>
</table>

Mill yield data from the Burdekin region—tonnes of cane harvested per hectare for various years

<table>
<thead>
<tr>
<th>Class</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early-season plant</td>
<td>138</td>
<td>147</td>
<td>136</td>
<td>127</td>
<td>139</td>
<td>138</td>
</tr>
<tr>
<td>Mid-season plant</td>
<td>122</td>
<td>139</td>
<td>130</td>
<td>108</td>
<td>119</td>
<td>123</td>
</tr>
<tr>
<td>Late-season plant</td>
<td>113</td>
<td>125</td>
<td>110</td>
<td>106</td>
<td>99</td>
<td>110</td>
</tr>
<tr>
<td>Replant</td>
<td>106</td>
<td>131</td>
<td>108</td>
<td>110</td>
<td>105</td>
<td>112</td>
</tr>
<tr>
<td>Early plant increase over late plant</td>
<td>25</td>
<td>22</td>
<td>26</td>
<td>21</td>
<td>40</td>
<td>28</td>
</tr>
<tr>
<td>Early plant increase over replant</td>
<td>32</td>
<td>16</td>
<td>28</td>
<td>17</td>
<td>34</td>
<td>26</td>
</tr>
</tbody>
</table>
From the data it can be seen that there are large yield benefits with early planting. In Bundaberg, the average yield benefit over the five-year period from 2009 to 2013 was 29 tonnes of cane per hectare. During the same period, the average yield benefit in the Burdekin was 28 tonnes of cane per hectare.

In all years the earlier planted cane had higher yields than the later planted cane blocks. The yield increases from the mill data and the trial work are similar, which gives confidence to the data.

The planting date is often determined by weather conditions, with wet weather being a significant barrier to early planting in parts of the industry, particularly in the Northern region. While we cannot control the weather, we can plan for it. A few steps that can reduce the risk of early planting and facilitate the planting operations include:

- Preparing preformed beds before the wet season to aid in farm drainage.
- Using disc-opener planter to reduce the amount of tillage required at planting.
- Ensuring plant material blocks are planted early the previous year to ensure adequate planting material is available for early planting.
- Using short-season legume fallow crops or spraying out fallow crops early to enable early planting. Ideally, fallow crops should be sprayed out 6 weeks before planting to allow breakdown of material.
- Ensuring soil temperatures are above 17°C when planting and will stay that way for a few weeks.

If the yield benefits from early planting are to be realised, a number of steps need to be taken to set the farm up for early planting.

Key points

- Plant cane yields can be increased by planting early.
- Yield benefits from early planting of up to 40 t/ha have been measured.
- Early planting needs to be part of the farm plan.
- Preformed beds aid with drainage.
- Preformed beds reduce the level of tillage required at planting.

Below: Double-disc planting into preformed raised beds aids in drainage and allows for earlier planting.
Good drainage pays benefits to growers

High watertable affects cane yield

Yield increases of up to 22 tonnes cane per hectare have been measured in research trials in wet blocks where subsurface drainage pipes were installed to lower the watertable.

Waterlogged soils cause denitrification

The loss of nitrogen from fertilisers on waterlogged soils is high. The denitrification process converts the nitrogen that would normally be taken up by the cane roots into gases that are lost to the atmosphere.

Wet soils encourage diseases

Chlorotic streak disease and pineapple sett rot disease thrive in wet conditions and cause heavy yield losses.

Waterlogged blocks reduce efficacy of pre-emergent herbicides

Prolonged, saturated soils may cause the premature breakdown and loss of pre-emergent herbicides.

Wet blocks delay planting

Normally, wet blocks cannot be planted early. Early planting can greatly increase cane yield compared to planting later in the year.

Waterlogged blocks delay farming operations

Weed and pest control, fertilising, cultivation and harvesting will be delayed until blocks have dried sufficiently to allow operations to proceed.

Wet conditions ruin legume crops

Fallow legume crops will completely fail on blocks that are continually waterlogging.

The importance of adequate drainage

Poorly drained blocks will produce substandard cane yields and make farming operations difficult to undertake.

Poor drainage compromises soil health and reduces nutrient-use efficiency.

Poor drainage of canefields causes major sugarcane losses, particularly in the Wet Tropics and during high rainfall, flooding and cyclones. To illustrate the magnitude of losses, research has shown that cane yield decreases by about 0.5 tonne/ha for each day that the watertable is less than 0.5 metre below the ground surface. If the water is saline, the losses will be even higher.

Water infiltration through heavy, slowly permeable soils and on sodic and hard-setting soils may require other strategies to fix drainage problems.

In summary, good surface and internal drainage is an essential component of sound farm management, particularly in regions of frequent high rainfall.
Drainage strategies
Good drainage of cane blocks can be achieved in a number of ways: laser levelling, subsurface slotted pipes, mole drains, lowered headlands, and mounding.

Laser levelling

This uses a laser-guided land plane to eliminate shallow depressions, hollows and high spots within blocks. Laser levelling can be a fast and economic way to level large areas of land to provide a uniform surface and suitable slope for improved surface drainage. However, laser levelling is not necessarily the complete answer to poor drainage.

Subsurface slotted pipes

These can very effectively drain underground springs and permanent wet patches but are usually too expensive for large areas. Subsurface drainage improves soil health by increasing aeration of the soil and increasing fertiliser-use efficiency. They can also prevent or reduce salinity.

Mole drains

These have limited application but can be a relatively inexpensive way to drain the subsurface of blocks. They may be useful when low slope or heavy subsoil restricts downward drainage and in perched watertable situations.

Mole drains are unlined channels formed in a clay subsoil with a ripper blade pulling a bullet-shaped cylinder. For best results, soils should have a minimum of 35 per cent clay. Sand content should be less than 30 per cent. There should be no stones at the mole drain depth. Although mole drains usually have a limited life, some have operated for up to a decade.

Mound planting

Mound planting into raised beds on blocks that are often inundated with water will keep most of the root system above the water level.

Lowered headlands

These are essential to allow water to drain from blocks.
North Queensland drainage project aims to increase cane yields

Productivity services groups have a key role in extending research information from SRA to growers. Practical on-farm extension is the best way to demonstrate the benefits of new research or even long-standing, well-known farm management techniques.

Under a pilot program, SRA is funding several projects in New South Wales and Queensland to show the value of new farm techniques and technology. If the pilot is successful, SRA intends to roll out the program across the industry.

With support from SRA, the Mulgrave Productivity Services group is coordinating a project with local growers to demonstrate the value of laser levelling of blocks to improve the drainage of surface water.

Problems with waterlogging

High rainfall, slow run-off and low infiltration of water down through the soil profile all contribute to prolonged waterlogging. The results of poor drainage include:

- loss of applied fertiliser,
- loss of applied pesticides,
- delayed field operations,
- disease risk increased, and
- damage to soil structure caused by machinery before the soil has died out.

All these factors contribute to reduced cane yield and can affect not just the current crop but the entire crop cycle of about five years.

Surface drainage management

Surface water in cane blocks can be managed in several ways. Mounding is a technique that reduces waterlogging impacts on cane by keeping the stool above the watertable. Secondly, ensuring headlands are not higher than the ends of blocks is a simple way of making sure that water is not pooled inside the cropped area. The third method to manage surface water is laser levelling the block.

Yield losses due to waterlogged blocks

Research has proven one of the causes of yield decline is when cane blocks remain waterlogged for long periods. Besides the impact on yield, environmental consequences can occur when nitrogen fertilisers are broken down in the anaerobic (lack of oxygen) conditions of waterlogging. This process is called denitrification. When nitrous oxide is formed it is one of the most toxic gases, having 310 times the global warming potential of carbon dioxide.

The trial

Many farms in north Queensland endure problems caused by excess water. One district participating in the program is Mt Sophia between Gordonvale and Babinda. Mt Sophia’s average annual rainfall is almost 3.5 metres. As a result, many farms in that area have limited productivity caused by prolonged wet conditions.

A total of 45 ha in recognised waterlogged-prone areas will be involved in the demonstration trial. Yields will be compared with adjacent control blocks where laser levelling has not been conducted. Monthly monitoring will measure crop vigour and performance. At harvest, mill data will be used to quantify the benefits of laser levelling.

The results of the project will be shared with field tours of the project trial during grower meetings and highlighted in future SRA news publications available from sugarresearch.com.au

Waterlogged cane fields during crop production cycle

Above: An almost flat block that holds surface water for long periods. Laser levelling will help drain surface water faster, resulting in less crop damage in prolonged wet periods.

Above: During a recent wet season, this waterlogged block was not trafficable for months. The young crop became infested with weeds that could not be controlled.
New SRA Development Officer hits ground running in the Burdekin

Cane growers in the Burdekin are looking forward to working with energetic and well-respected research operative Belinda Billing. She joined the SRA team as the new Development Officer based in Ayr in mid-March.

According to Andrew Ward, Manager of SRA’s Professional Extension and Communication Unit (PEC), Belinda will be a key interface for SRA in the Burdekin.

'This role works closely with industry, landholders and other stakeholders to direct and extend SRA’s research outcomes,' he says. 'The flip side of the job is feeding back into ensuring SRA’s research remains targeted and relevant.'

Dr Ward says Belinda will be collaborating with advisors and local grower groups to promote adoption of research and management practices proven to improve farm productivity, profitability and sustainability – an area she has a lot of experience in.

Belinda recently relocated to Ayr from Mackay, where she had become well-known for her work with local growers in her previous role with natural resource management group Reef Catchments. It was here she become well-known not only by Mackay and Whitsunday growers, but also farmers across the State through her coordination role with Project Catalyst.

Belinda says that she is particularly looking forward to continuing her work with farmers with on-farm profitability, innovation and sustainability initiatives.

'I'll be really focusing on listening and understanding the needs of growers and liaising with industry to learn how SRA can direct and extend research outcomes and improve service and relationships on ground,' she says.

'The Burdekin has such a unique geography, weather and soil profile that it will be particularly rewarding working with farmers on the practices which best suit the landscape here. It certainly is not a one size fits all approach when you have so much variation right across the district.'

Belinda says that understanding issues and challenges that program partners and landholders are facing and finding ways to share information effectively will be key to the success of the role.

Working with growers, SRA staff, productivity boards, Reef Catchments staff, CSIRO and respected independent agronomists has given me access to an amazing pool of knowledge around sugarcane; in terms of best practice management, industry issues and challenges, environmental challenges, current research, and a good understanding of farm culture,' she says.

'I really enjoy interacting with industry, landholders and community – particularly creating opportunities to learn and improve together.'
One of the grower’s biggest challenges in producing a high-potential sugarcane crop is a good strike (plant emergence). This is obvious from a simple observation – the total percentage of gaps in a block equals the percentage of lost production. Sugarcane can accommodate small gaps with its ability to tiller but if the gaps are greater than 0.7 meters, it becomes difficult for the cane stool to make up the difference in yield.

Factors preventing a good strike rate

There are six main factors that prevent a good strike rate:

- Poor-quality seed source
- Excessive billet damage
- Excessive soil coverage and sett-to-soil contact
- Low soil temperatures and moisture
- Direct contact with fertiliser
- Disease infection.

If we evaluate the possible causes of a poor strike, we can then identify ways to overcome them and achieve an acceptable strike aimed at ensuring maximum yield potential.

Example:

If there are 10 per cent gaps in a block that has a potential to produce 140 tonnes of cane per hectare (TCH) before the crop starts to develop, it has lost 14 TCH of its potential.

\[
\text{Gross return} = 140 \text{TCH} \times 40 = 5600 \\
14 \text{TCH Loss} = 560
\]

Keep in mind that all your input costs will still be the same, with or without the gaps. That $560 could have covered the fertiliser cost/ha.

Poor-quality seed source

As with any cultivated crop, if approved clean seed is not used then a higher risk of disease infection and poor germination can be expected. With sugarcane, approved seed is distributed by the local productivity services and multiplied on farm.

It is important that this multiplication is done on clean fallow ground (bare fallow, legume fallow etc.) to reduce the risk of disease infections and mixed varieties from volunteer cane. The plant material should be either from the plant crop or 1st ratoon to ensure viable material.

Excessive billet damage

Excessive damage to billets and eyes has two main consequences: a) it allows diseases to invade; b) it prevents germination from the eyes. To reduce the damage, use rubberised feeder rollers and optimise the harvester (feed train is synchronised to avoid crushing of billets).

Where possible, try to achieve a billet length of 250 mm with two or three eyes. It’s a form of insurance: if one eye is damaged then the second and third are viable.

Excessive soil coverage and ensure sett-to-soil contact

It is important that the billets are planted and covered with a reasonable amount of soil. The soil must be in firm contact with the sett to prevent the sett from drying out and preventing germination. Excessive soil coverage under cool wet conditions delays emergence and allows diseases to develop that prevents emergence. Depending on soil type, a general guide is to cover the sett with 50–75 mm of soil.
Direct contact with fertiliser

Potassium-based fertilisers dehydrate cane setts and prevent emergence. Therefore as a guide, avoid placing fertiliser in contact with setts. Apply potassium-based fertiliser at least 50 to 75 mm away from the setts. As DAP is the main fertiliser at planting and is not potassium-based, its application distance is not as critical.

Soil temperatures and moisture

Sugarcane is a tropical plant and requires a soil temperature of 18°C to germinate. Avoid planting cane in cold conditions. Moisture is needed for germination but not wet conditions, as cold and wet conditions favour Pineapple sett rot disease.

Disease infection

The main disease that affects germination of the buds in planting material is Pineapple sett rot. Caused by a fungus (*Ceratocystis paradoxa*), Pineapple sett rot is often confused with Fusarium sett rot (*Fusarium moniliforme*) which is only a minor disease. Both diseases are soil-borne and are favoured by cold, wet soil or excessively dry soil. Both slow germination of the cane. The fungus is present in all sugarcane soils and it multiplies on any organic matter. It infects the sett through cut ends or damaged areas.

Above: Pineapple sett rot.

Prevention and control

Use a registered fungicide and ensure thorough coverage of the sett, particularly the cut ends. Because both diseases are soil-borne, avoid plough out replant as it provides an ideal food for multiplication of the fungus, which creates high numbers of spores in the soil. The use of a rotational crop or fallow period between cane crops reduces the potential of the disease.

Registered fungicides for Pineapple sett rot

See the table below. Read product labels before use.

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Active ingredient</th>
<th>Rate</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilt® 250ec, Bumper® 250ec, Throttle®</td>
<td>250 g/L propiconazole</td>
<td>20 mL/100 L water</td>
<td>Ensure thorough coverage of the cut ends of sugarcane setts.</td>
</tr>
<tr>
<td>Tyrant® 500</td>
<td>500 g/L propiconazole</td>
<td>10 mL/100 L water</td>
<td>Ensure thorough coverage of the cut ends of sugarcane setts.</td>
</tr>
<tr>
<td>Bayfidan® 250ec</td>
<td>250 g/L triadimenol</td>
<td>20 mL/100 L water</td>
<td>Apply to setts by dipping or spraying. Ensure thorough wetting of cut ends.</td>
</tr>
<tr>
<td>Sportac®</td>
<td>450 g/L prochloraz</td>
<td>40 mL/200 L water</td>
<td>Apply as a dip or spray to setts at planting. Ensure thorough coverage of all cut ends.</td>
</tr>
<tr>
<td>Shirtan®</td>
<td>120 g/L mercury (Hg) present as methoxy ethyl mercuric chloride</td>
<td>250 mL/200 L water</td>
<td>Apply as a dip or spray to setts at planting. Ensure thorough coverage of all cut ends.</td>
</tr>
<tr>
<td>Sinker®</td>
<td>500 g/L flutriafol</td>
<td>500 mL/ha* or 7.5 mL/100 m row</td>
<td>Apply as a dip or spray to setts at planting. Ensure thorough coverage of all cut ends.</td>
</tr>
</tbody>
</table>

Fusarium sett rot: There are no registered fungicides for the control of Fusarium sett rot, and the activity of chemicals is unknown. The broad spectrum fungicides used to control Pineapple sett rot may have some activity.