Burdekin Productivity Services

PRODUCTIVITY PROFITABILITY SUSTAINABILITY

Funded by Burdekin Canegrowers and Wilmar Sugar

Grower Update

ISSUE 38 – JUNE 2020

Welcome to the June issue of our BPS newsletter. We hope you find the articles contained in this issue informative.

This issue contains:

NOTICE OF ANNUAL GENERAL MEETING

When: Tuesday August 25, 2020

Where: Ayr Showgrounds Hall

Time: 1.15 pm for a 1.30 pm start

Guest Speaker: Rob Magarey – SRA Principal Research Scientist on "Sugarcane Diseases and Pests: Risks, Consequences and Monitoring"

GRUB FLIGHTS

BPS Field Officers recently conducted grub flights across the district to record obvious grub damage and then ground truth these observations. Overall, it is pleasing to report that grub damage appears to be minimal this year from what was observed. A handful of up river blocks on the Home Hill side were observed, along with a smaller number of blocks than previous years in the Giru area. Growers who had obvious damage are being contacted by BPS staff. BPS staff also observed that overall this year's crop looks quite good from the air, so hopefully the weather is kind to us throughout the harvest season!

Map of flights taken in early June to observe grub damage

IMIDACLOPRID UPDATE

As mentioned in previous newsletters, Imidacloprid (the active ingredient in both liquid and granular grub control products) is under review by the APVMA. It is critically important that growers follow all label directions and ensure that placement of the product is correct to minimise potential environmental impacts, and most importantly, allow the product to have the best opportunity to control the target pest. Label instructions vary from product to product, and there are differences between plant and ratoon instructions, so understanding and following the label is very important.

Some key factors to consider for various products include:

- Plant cane – liquid products
  - Nuprid is registered for use between June and November
  - Confidor Guard is registered for use between August and November
- Ratoon cane – liquid products can only be used between September and November
- Liquid products should be applied 100-150 mm deep with 100 mm of coverage
- If side dressing liquid products, coulters should be no wider than 500 mm apart
- When using granular products, ensure it is placed in a band no more than 15-20 cm wide and is 15-20 cm deep from final hill up height

WSRA17 AND VARIETY MIX

WSRA17 has been in high demand from BPS approved seed cane plots this year. BPS staff have received a few calls regarding the slow germination of WSRA17. It is a variety that performs similarly to Q208 when it comes to germination. WSRA17 germinates reasonably quickly in the warmer weather at the start of the planting season, but when moving into cooler temperatures, it is quite a bit slower to germinate. However, in our experience, it is a reliable germinator based on what we have observed at our seed plots as well as variety trials across the district.

A reminder that we also recommend planting WSRA17 with Sinker as a fungicide, because it is rated as an intermediate-susceptible variety to smut. Sinker will control smut spores in the soil and has some effect controlling smut if the plant source was infected. It should be noted that we have NOT observed any smut in any commercial or strip trials involving WSRA17 over the last 6 years.

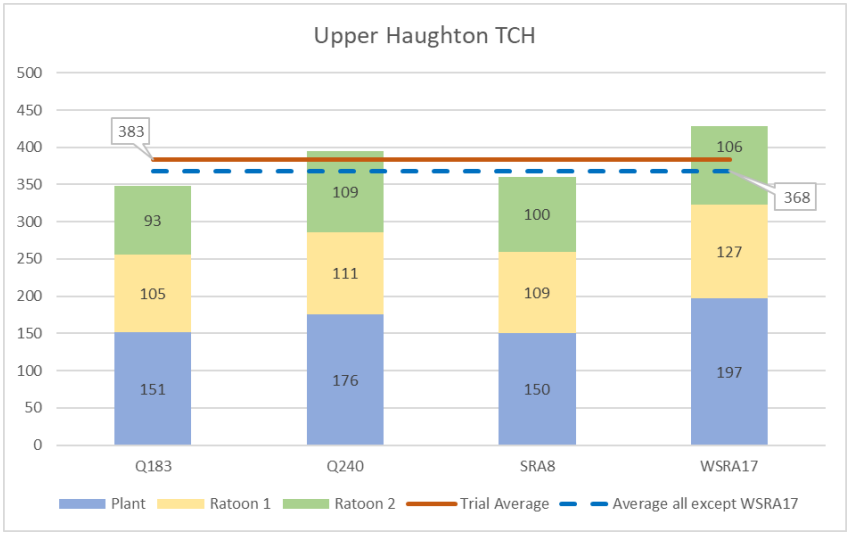
It is also worth noting that when planning varieties to plant on your farm, you should consider your risk profile. We recommend planting no more than 40% of your farm to a single variety to minimise the risk to your business.

If you have any further questions about WSRA17 or any variety, call any BPS staff member.

VARIETY TRIAL RESULTS

BPS has collated the results of the variety strip trials that were harvested between 2017 (trials planted 2016) and 2019. These results are available on the BPS website (https://bps.net.au/2018/wp-content/uploads/2020/05/Variety-trial-summary_2017-2019.pdf) or by contacting the office or any of the staff.

Trial results are available for 7 sites. Six of these are trials with WSRA17, and / or SRA23 (Aerodrome, Iona, Millaroo, Mulgrave, Rita Island and Upper Haughton). The final site was Stockham Road which was comparing the performance of a range of varieties on a sodic soil.



For each trial we have graphed the performance of each variety over the life of the trial. For the tonnes of cane and tonnes of sugar these are cumulative graphs. Each bar represents a variety in the trial. Each of these bars are made up of the yields from each crop class. For example the Upper Haughton cane yield is shown to the right. In this trial we have Q183, Q240, SRA8 and WSRA17; and results are available for the plant, first and second ratoon crops. If we use Q240 as the example we can see that it cut 176 tonnes/ha in plant, 111 tonnes/ha in first ratoon and 109 tonnes per hectare in second ratoon. Giving a total yield so far of just under 400 tonnes/ha. Compare this to the Q183 which cut 151 in plant, 105 in first ratoon and 93 in second, for a total of 350 tonnes/ha.

By presenting the results this way we can start to see if particular varieties are performing consistently better or worse than the others in the trial. We can also see if a variety cuts well in plant cane, but then drops off in ratoons in comparison to the rest of the trial.

Each graph also shows the trial average. For the Upper Haughton this is 383 tonnes/ha, so Q240 at 400 tch has performed better than the average of all the varieties, and Q183 (350 tch) has performed worse.

The CCS graphs are presented slightly differently. Because it isn't logical to add the CCS together, we have shown CCS as individual bar graphs for each crop class. The average for each variety is shown as a line.

WSRA17 – Six trial sites

The trial results so far have shown that WSRA17 has performed well at Rita Island, Upper Haughton and Aerodrome. All three of these sites are clay loam to light to medium cracking clay soils. At these sites, WSRA17 has the highest cumulative yield over the life of the trial and the results have been consistent. That is, it has cut well in each class harvested so far.

At Millaroo and Iona, WSRA17 has been one of the lowest yielding varieties. With only one year's results from Mulgrave, it is too early to determine its performance on a heavy clay/sodic duplex.

SRA23 – Four trial sites

The results for SRA23 have been more variable. At Millaroo it is the second lowest yielding, but overall it has performed similarly to the commercial varieties (SRA8 and Q240) in this trial. At Aerodrome it came second behind WSRA17 (but only by 1 t/ha over 3 years of harvests). Yet at Rita Island it was the worst performing variety with a cumulative yield 30 t/ha less than the WSRA17. The final site was Mulgrave, and again there isn't enough data to draw any real conclusions.

As trials are harvested this year we will keep you updated with the progress of the new varieties.

APPROVED SEED CANE – PRICE VS COST

Sugar cane farming is a business like any other in the Burdekin, Queensland, Australia, or the world. No matter what business you are in, there are always important financial decisions to be made. In making such decisions, 'false economy' must be avoided otherwise productivity, profitability and sustainability will suffer.

The definition of the term 'False Economy' can be described as **an apparent financial saving that in fact leads to greater losses.**

Let's apply false economy to the question of whether to purchase seed cane for your farm.

At BPS we are constantly questioned over the price of approved seed cane. Why should it be purchased when it is so expensive? How come the harvester operator charges so much? These are questions relating to price. **Cost is not always the same as price**. The question relating to this business decision should be - **What is the cost of not purchasing approved seed cane?**

The chart below explores price of seed cane versus the cost of not purchasing approved seed cane.

Item	Details	Seed price/t	Farm price/t	Explanation
Plot Cane	Plants	$45-$60		Prices vary between plots depending on ownership subsidies. Plot cane is held back & ploughed out after first ratoon.
	Harvester	$30		Harvester prices are constant at all plots. Price reflects operating expenses, down time/waiting around, on call, return per tonne on capital investment (Harvester).
Farm plants	Plants		$30-$35	Plants cut from farm are not sent to mill (less harvesting $8)
	Harvester		$15-$20	Planting rate per hectare includes harvesting costs – but may not be itemised - less down time & greater throughput than plot harvesting
Extractor loss - Plots	Cut green estimated 20% loss	$0		Plot holder accepts extractor losses, member pays only for billets delivered
Extractor loss - Farm	Cut green estimated 20% loss		$6-$7	Decreased yield from plant source. Grower incurs loss estimated to be 20% of material through extraction

Item	Details	Seed price/t	Farm price/t	Explanation
Plot cane growth	Plants held back to 80 - 100 t/ha	$0		Plot holder accepts losses from reduced yield potential
Farm cane growth	Plant source immature		$8-$17	Grower accepts losses from reduced yield potential - could be 25-50% more cane if allowed to grow out fully for milling
Total Price		**$75-$90**	**$59-$79**	***This is the price of seed cane vs farm sourced plants. There isn't a great deal of difference in price.***

COST	Details	Approved Seed cane	Farm source	Explanation
Disease	RSD	Nil	Invisible loss. Estimated 5-10% loss in infected crops	Although irrigation masks RSD (Ratoon Stunting Disease) to a certain degree, this disease can cause crop losses of 10-50% in other regions. A 5-10% loss may not be evident in higher yielding Burdekin crops, however it is still a loss of considerable income that compounds with each subsequent ratoon crop.
Other Diseases	Yield Decline	Nil	Invisible loss. Estimated 5-10% loss	Old seed source more than 5 years from hot water treatment i.e. 3 years from plot distribution, or poorly selected seed source may result in propagation and accumulation of other diseases throughout the farm resulting in yield decline.
Total Cost		**$75-$90** **EXACT COST**	**$100+** **UNKNOWN COST**	***Cost of farm sourced plants may be greater than approved seed cane in certain circumstances, the extent of which is not easily quantified! Approved seed cane however, has a known cost & is great insurance against disease and subsequent cumulative yield losses.***

BPS recommends that all cane growers propagate an area of approved seed cane on their farm as a source of clean uncontaminated planting material.

Management recently produced a report for the board of directors examining an optimum area each grower should set aside for seed cane propagation. This report estimated approximately 1% of farm area should be dedicated each year for planting of seed cane sourced from an approved seed cane plot. District wide, BPS would require around 7000-8000 tonnes of approved seed cane production to satisfy this requirement. Some varieties from the plots do not sell out, so add 25% to this figure to arrive at 9000-10000 tonnes for distribution. Currently the district's plots have the potential to grow this amount at a yield of 80 tonnes per hectare.

YCS – ALL YELLOWS ARE NOT EQUAL

There are many reasons that a crop may display yellow leaves throughout its lifecycle. Pests, diseases, climate, syndromes and agronomic factors can all play a role. BPS has been road testing the SRA YCS Identification Kit over the last season and the results have been recorded and shared back with SRA. Results from this will be communicated later in the year. One of the most challenging things we find when in the field is the many variations of crop yellowing.

So, when the crop is yellowing what could be the cause/s? There are several possibilities

- Under/over irrigation causing waterlogging or water stress
- Unmanaged soils - sodicity/salinity
- Nutrient deficiencies such as copper/zinc/temporary iron/nitrogen/potassium/sulphur
- Chemical damage
- Grub damage
- Insect damage

This list is quite long but not exhaustive; and YCS also causes yellowing. But, the characteristics of YCS development and expression are quite specific. YCS is a mid-canopy disorder and when yellowing starts there will be green leaves above and below (Fig.1). Yellowing is located between the 2nd and the 6th fully expanded leaf and is most commonly seen in the 3rd and 4th leaf. One of the important things to remember when identifying YCS early in its development is that there shouldn't be any die-back from the tip on the yellow leaves. Figure 2 shows how the yellowing progresses along the leaf; note the golden-yellow colour which is quite different to other forms of yellow in sugarcane.

Commonly when we are looking at field expression of yellow there are many crops that have symptoms that do not quite match the criteria of YCS. SRA have kindly shared with us some images that were used in the industry Q&A for YCS. These show many different types of yellow seen in the field (Fig 3-5).

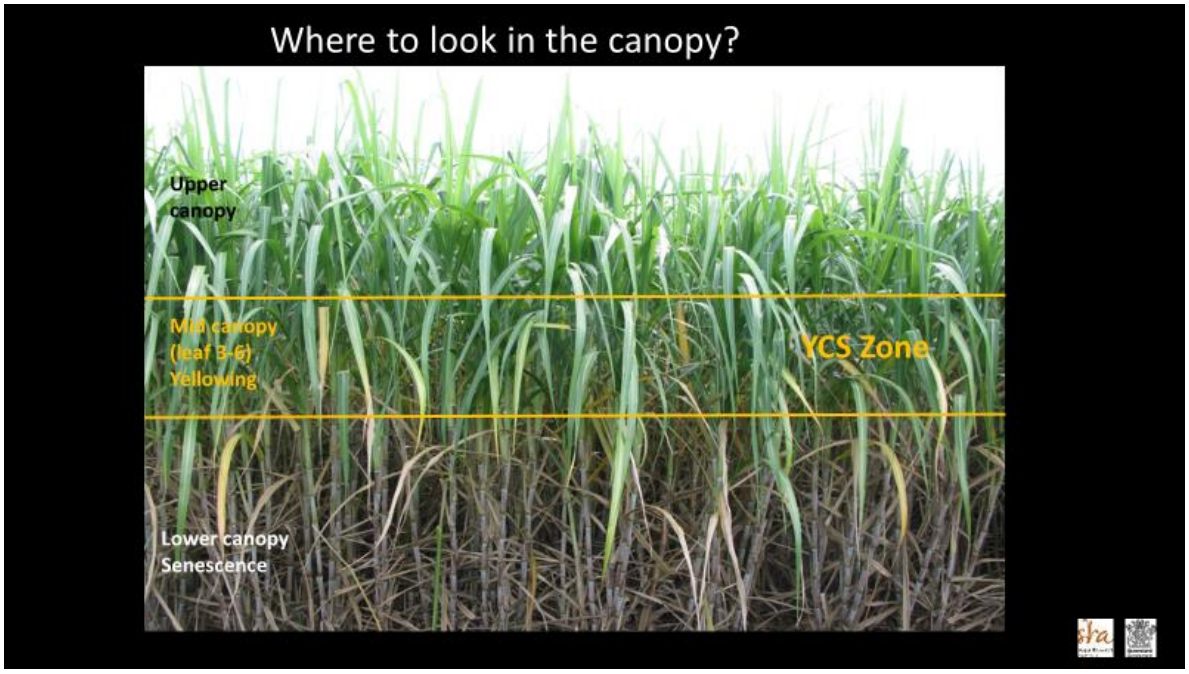


Figure 1 YCS usually starts in leaf # 3 or 4 in the mid-canopy. Look for green leaves above and below. (image supplied by Sugar Research Australia)

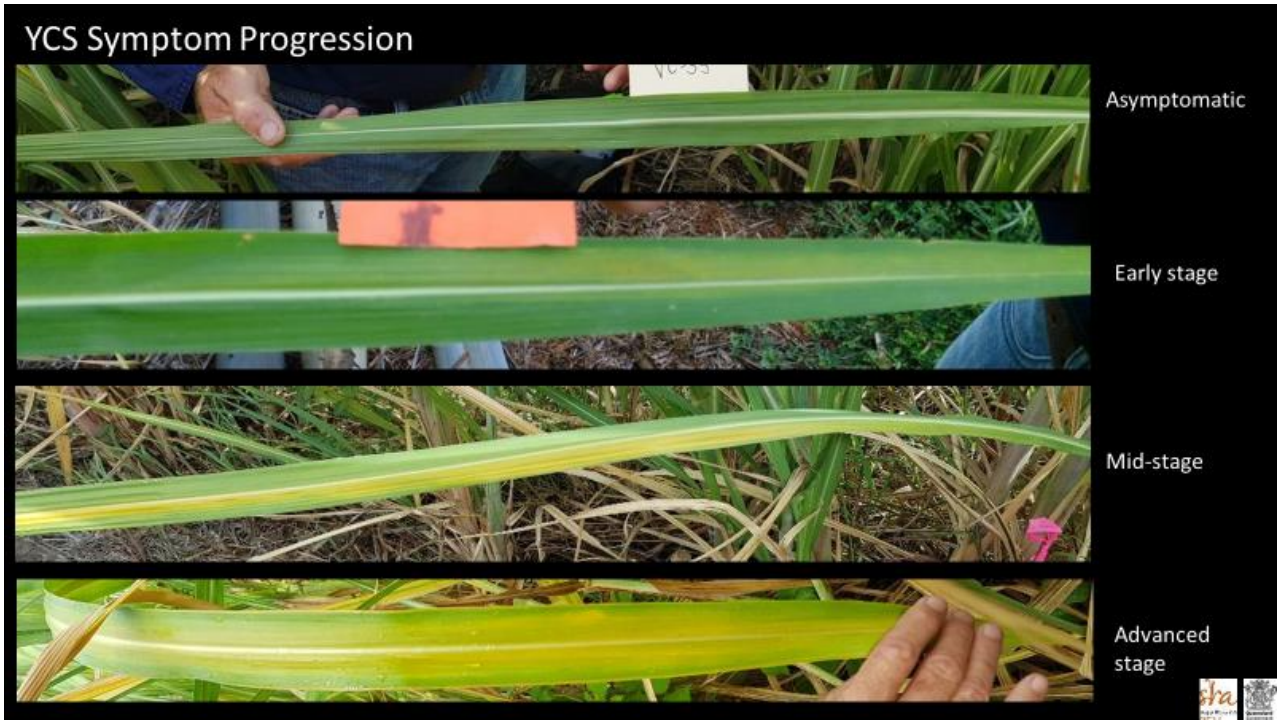


Figure 2 YCS symptom development along the leaf. Yellowing will progress up the canopy. (image supplied by Sugar Research Australia)

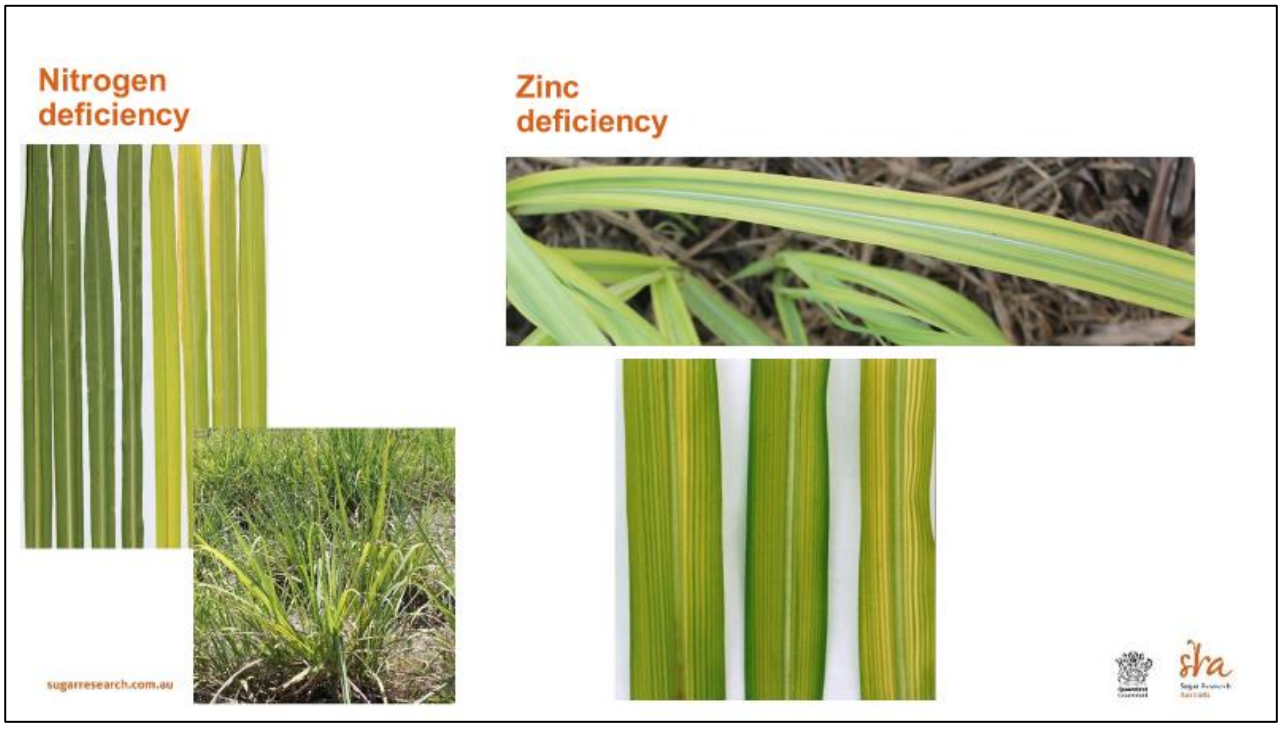


Figure 3 Nitrogen deficiency shows pale yellow from the base of the plant. Zinc deficiency shows veinal yellowing. (image supplied by Sugar Research Australia)

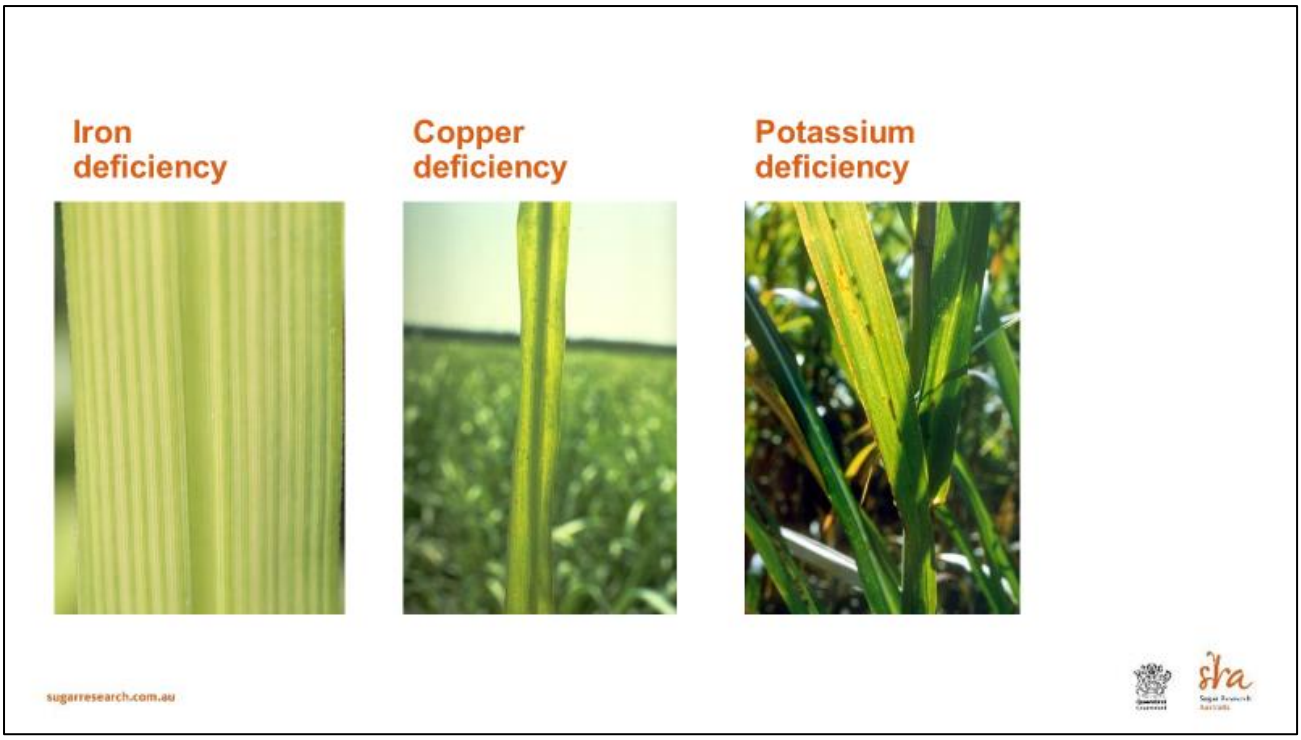


Figure 5 Iron deficiency displays as pale yellow between the veins of the leaf; copper deficiency exhibits as pale yellow between the veins with dark green patches (droopy top and rubbery stalks); potassium deficiency exhibits in older leaves first, dead areas, yellow/brown/dark red stripes may occur between leaf veins and along leaf edges and tips. (image supplied by Sugar Research Australia)

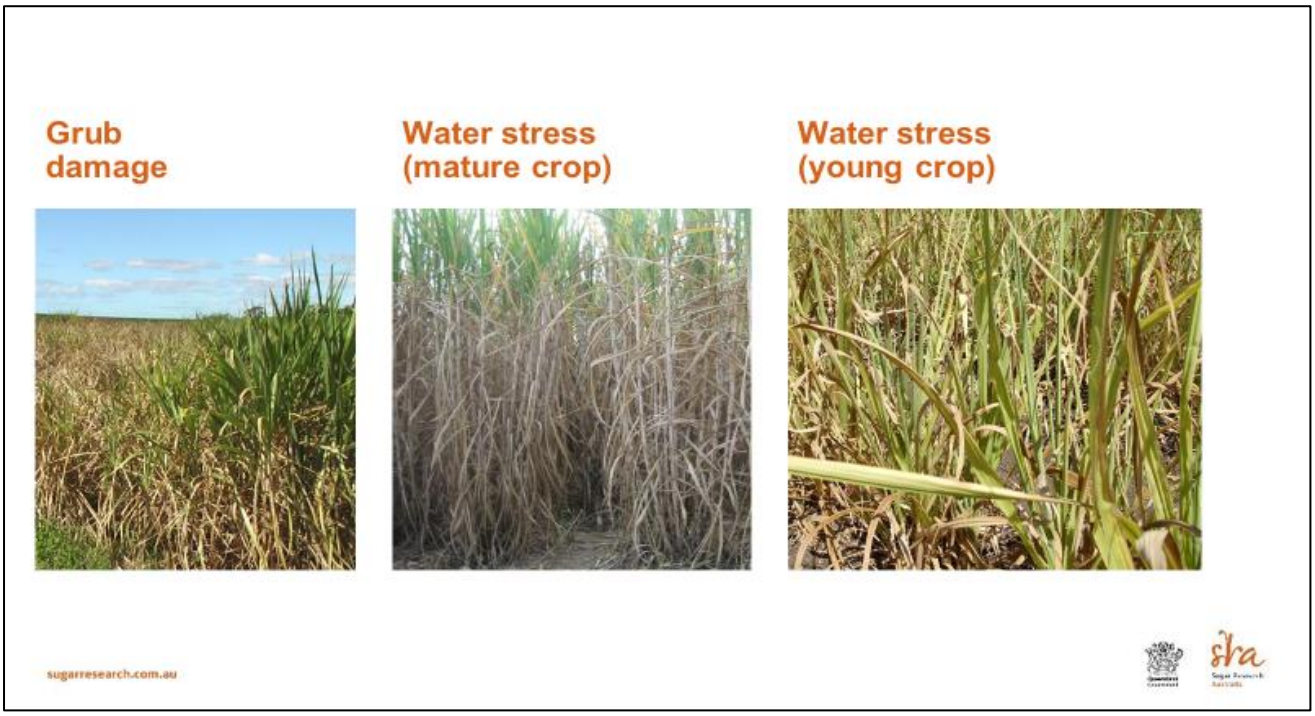


Figure 6 Leaf yellowing caused by canegrubs and water stress. (image supplied by Sugar Research Australia)

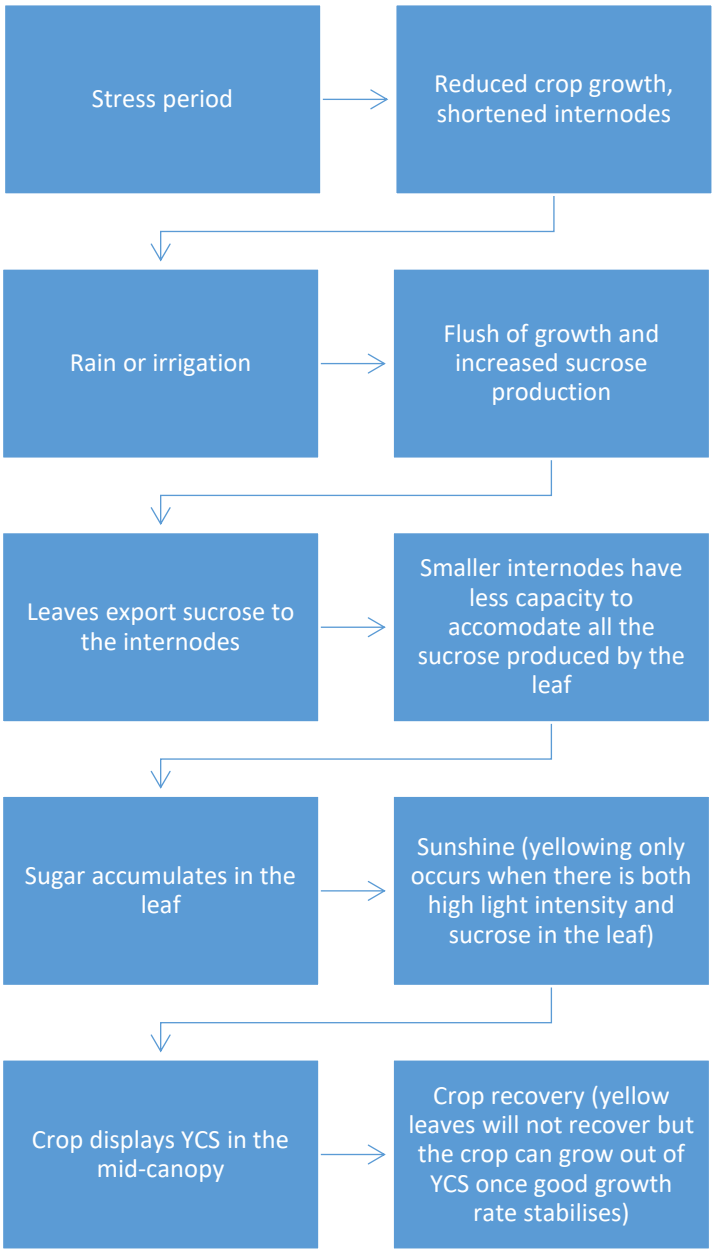
A good way to check if the crop has been under stress is by stripping back the leaves and checking the size of the internodes. Short internodes followed by longer internodes indicates where the growth rate has slowed up and then increased. A series of short internodes indicates a period of stress on the crop. When this is followed by rapid growth the leaf above the short internode may show YCS symptoms. High light

intensity is required for yellowing to occur. Therefore, to reduce the risk of YCS development, do everything possible to not let your crop slow up.

Now that the season has changed (autumn – winter), and the weather is getting cooler with shorter daylengths, there will be less YCS expression.

BPS has been talking with SRA researchers about YCS to make sure that we have a clear understanding of how to correctly identify YCS in the field. One of the points that has come from this is that YCS does not behave like a disease, as it appears in the crop one year then may not show again, or it shows up in another field on the farm or next door. In the discussions we have had with the researchers they have indicated that the yellowing is the culmination of environmental or biotic stressors impacting the crop. We have put together a basic flow chart to demonstrate the process of YCS expression in a crop.

YCS expression flow chart



GREEN WASTE TRIALS

Through a series of trials, BPS is working with the Burdekin Shire Council to assess the potential of using council green waste as a soil ameliorant in the sugarcane farming system.

The idea for the trials comes from the fact that councils often have an excess of green waste, so there is a potential partnership if it can be utilised by the local agricultural industry. Just as mill mud is a great way to return nutrients and organic matter to the soil from by-products, the green waste trials aim to utilise a locally produced and available product that might otherwise go to waste.

The green waste was mulched to 25mm pieces from tree, garden, and other plant material and pasteurised to kill weed seeds. Care was taken by the Council to ensure no treated wood was included in the mulch and samples were sent away for analysis to check for contaminants such as heavy metals. The Council transported well over 400 tonnes of green waste to trial sites around the district.

In the Burdekin, four replicated strip trials have been established across a variety of soil types. These are sandy-loam delta soils of Kilrie and Burstalls, and others with higher clay content in Groper Creek and Giru. Two different application methods were trialed. These were spreading followed by incorporation; and forming a furrow and dropping green waste from mill mud trucks in bands. After a three to four-month fallow with the products being broken down in the soil, the blocks were ready for early plant in March-April 2020.

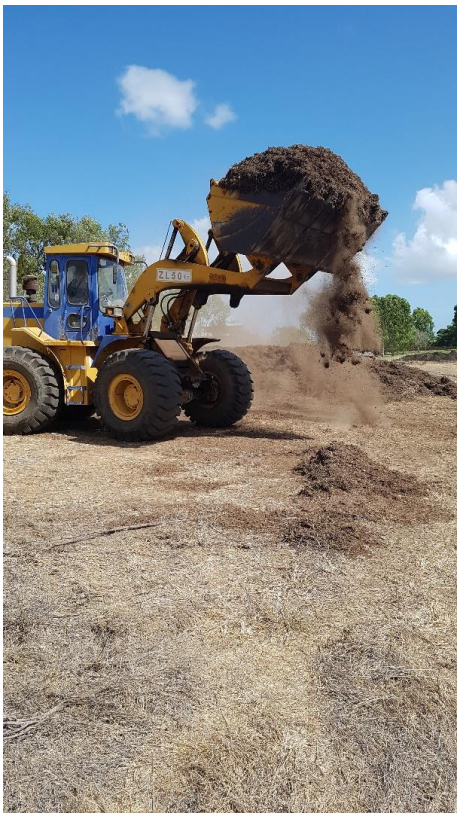
The trials will compare the green waste with other commonly used soil ameliorants such as mill mud, as well as a control treatment with no ameliorant products applied. Additional ameliorants, such as composts, have also been incorporated depending on the grower's interests and what they had available on-farm. We are particularly excited to see the results where we were able to mix mill mud and green waste by borrowing another grower's AeroMaster compost turner.

One of the potential benefits of applying green waste could be its contribution to soil health by supplying a carbon source for soil biology. To investigate this, we have partnered with SRA's Soil Health Project to road test their Soil Health Toolbox at all four sites and undertake in-depth biology sampling at one site.

The project is funded by a Landcare Australia and Herbert Productivity Services Limited are also participating alongside BPS. It will be great to work through the findings across multiple soil types and regions once the trials are harvested. Given that all sites were early plant cane this year, it will be at least another one to two years until we have harvest data to understand of there have been any yield benefits and if the idea is worth pursuing further. Watch this space.

Massive thanks to the growers who put their hand up to try something a bit different and be involved in these innovative trials, and also to BC Cartage who were instrumental in getting the products in the ground.

Green waste at Council's transfer station prior to mulching



Loading green waste on farm

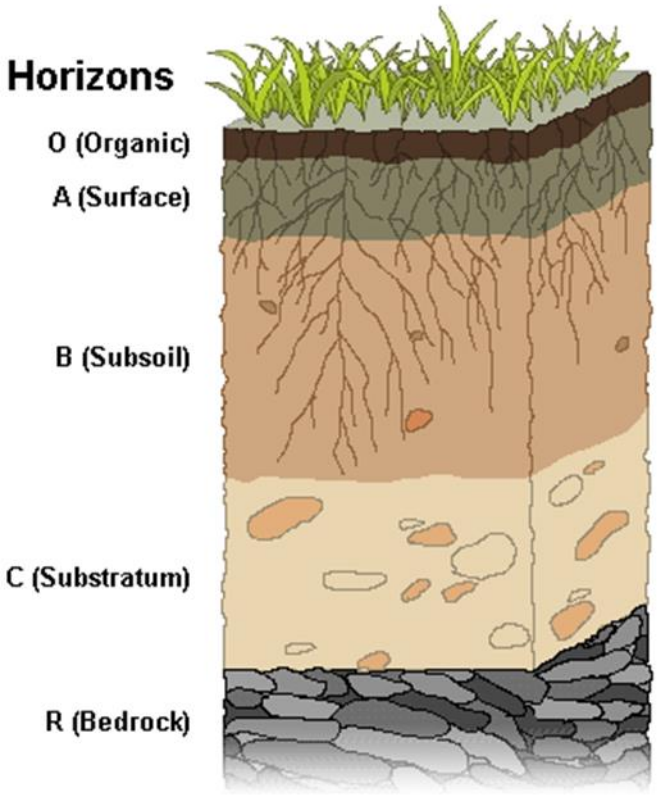
Decomposed green waste at 3-4 months

Green waste being banded in V's

SODIC DUPLEX SOILS

The Burdekin has large areas of soils that are classified as sodic duplexes. But what does this mean, and how does it affect management?

When soil scientists talk about soils they often refer to different horizons. Horizons are simply a different way of referring to the different layers within a soil. In most soils there will be a thin layer of organic matter on the surface in the undisturbed state. In cultivated soils this layer will usually have been incorporated into the A horizon. Under that will be the surface/topsoil layer or A horizon and below that the subsoil or B horizon. These horizons might be further broken down to A1 and A2, or B1 and B2.



Duplex soils are soils where there is a distinct textural change between soil horizons. A good example is a sandy loam soil overlying a clay soil.

Sodic soils are those where there is an excess of sodium in the soil profile. When they are dry these soils tend to form a hard, dense mass with few pores for water or air movement. When they are wet they have a tendency to slump and seal.

Sodic duplexes are soils where there is both a distinct change in texture and the major part of the B horizon is sodic, but not strongly acid. The Burdekin sodic duplexes are generally loams or clay loams overlying light to medium clays.

Sodic duplex soils in the Burdekin

The majority of sodic duplex soils are found in the BRIA with only small areas in the Delta (see map). They are subdivided into three groups based on the depth to the sodic layer and the level of sodicity. It is important to remember that these classifications are based on the soil in its natural state. Levelling and the application of gypsum are likely to have changed some of the soil properties.

2A – These are the shallowest soils. In their natural state they are strongly sodic (ESP greater than 15%) by 0.3 m. The A horizon is quite thin, usually less than 15 cm thick. These are the most challenging soils to manage because the sodicity is high in the profile.

2B – These soils are strongly sodic by about 0.6m. The A horizon is 15 - 30 cm thick.

2C – These are the deepest soils, often with lower sodicity. They are sodic (ESP 6 - 14%) to strongly sodic below 0.9 m. The A horizon is more than 30 cm thick. The soils in this group often have sandier A horizons than the 2A's and 2B's. These soils are easier to manage because the sodic layers are deeper and the level of sodicity can be lower than the other groups.

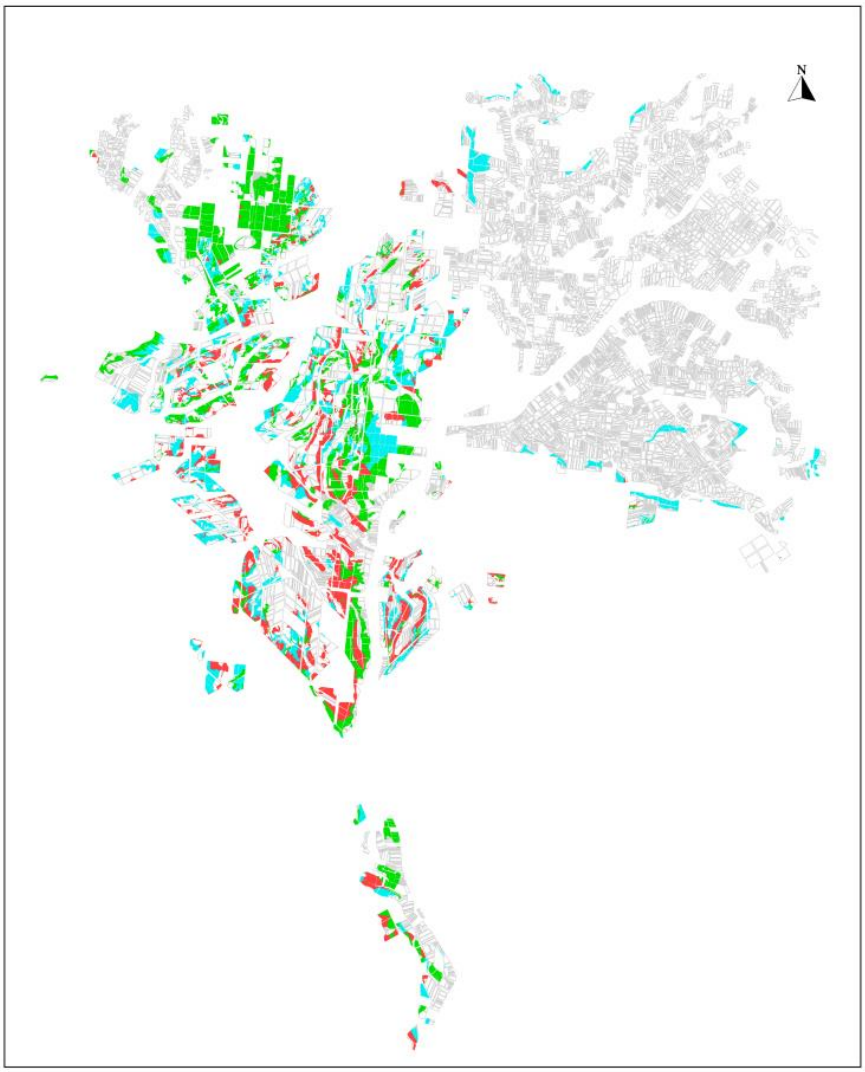
Implications for management

Sodic soils are known as being difficult to work because the moisture content range at which they can be successfully cultivated is very narrow. When the soil is dry cultivation results in large clods or, alternatively, bulldust; when the moisture content is too high smearing occurs.

Sodic soils also have a tendency to slump when wet. If the topsoil is sodic, surface sealing and crusting can occur, leading to problems with emergence. Slumping also affects water infiltration because the pore spaces have either collapsed or become clogged.

In sodic duplex soils where the top soil might be relatively friable and permeable but the subsoil is sodic and impermeable, waterlogging can occur.

The addition of calcium (in the form of gypsum or lime – depending on pH) is the usual remediation for sodic soils. The calcium displaces the sodium in the soil profile and helps to repair the structure. This increases pore spaces and allows better movement of air and water into and through the soil.



Sodic Duplex soils in the Burdekin
2A
2B
2C

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CROP NUTRITION - THE STORY OF SULPHUR

While sulphur is commonly associated with volcanos and the smell of rotten eggs and onions, it is it also an essential part of plant growth. Sulphur is interesting because it can be taken up by both leaves as sulphur dioxide and roots as sulfate. The most common pathway is through plant roots. Every living cell requires sulphur as it is a component of three of the twenty-one amino acids that form proteins.

What does the crop use sulphur for?

The sugarcane plant needs sulphur for chlorophyll formation, photosynthesis and plant growth. It is also required for plant cell metabolism and is a component of some proteins, enzymes and vitamins. In legumes sulphur is required for nitrogen fixation to occur.

How does the crop access sulphur in the soil?

A large amount of sulphur available for crop uptake is stored in the soil. Like nitrogen, sulphur is mineralised from organic carbon to the sulfate (SO_4^{2-}) form to make it available for plant uptake. Sulfate is not bound to the soil and can be at risk of loss due to leaching, this particularly evident in light textured soils.

How does the crop express sulphur deficiency?

- Sulphur and nitrogen deficiency can look very similar, with the leaves having a light green/pale yellow appearance. One important identification factor to remember is that sulphur is less mobile in the plant than nitrogen, this means that sulphur deficiency will show in the young leaves first.
- The young pale-yellow leaves can also display a purplish margin.
- The edges of the leaves become necrotic (plant cells die)
- The stalks and leaves become very thin and they might be flexible at the tip of the plant.

How is sulphur supplied?

Sulphur is supplied from rainfall, fertiliser, gypsum and irrigation water. In cropping systems the major sources of sulphur will be usually be fertiliser or gypsum. Rainfall will supply a small amount, but it is not enough to meet the crop requirement and it will need to be supplemented as part of the fertiliser program.

In some areas there are high sulphur levels in the irrigation water, particularly if it is sourced from a bore. This varies across districts and a water test should be taken to determine the amount that is being applied to the crop. The nutrient management program can then be adjusted to take this sulphur into account.

Sulphur deficiency in a very sandy soil. Note the pale leaves and the purplish margin. Photo courtesy of SRA.

Information sourced from:

Calcino, D., Schroeder, B., Panitz, J., Hurney, A., Skocaj, D., Wood, A. and Salter, B., 2018. *Australian sugarcane nutrition manual*.

Price, G. ed., 2006. *Australian soil fertility manual*. CSIRO PUBLISHING.

CANCELLATION OF SHIRTAN REGISTRATION

As of 16th June 2020, the Australian Pesticides and Veterinarian Medicines Association (APVMA) cancelled the registration of Shirtan. The use of mercury-based products has been under review for some time and many growers have been trialling alternative fungicides.

The cancellation of Shirtan has the following allowance:

- **Growers may still purchase and use Shirtan 12 months from the date of cancellation. The cancellation was published on 16/6/2020, so you may still use the product up until 16/6/2021.**

It is an offence to use or possess Shirtan from 17/6/2021.

BPS has conducted some trials over the last few years, and these have produced mixed results. In some trials, one product appears to have a marginal benefit over another, then the next trial had the opposite result! However, all trials that were taken through to harvested yields had no significant differences between any of the products (Shirtan, Sinker, Bumper/Tilt). It was also interesting to note that shoot counts early in the crop life did show some differences, however this did not translate to harvested yield differences.

If you are planting a variety that has an intermediate or higher rating for smut, BPS recommends using Sinker as a fungicide, as it will control smut spores in the soil, and has some control if the plant source is smut affected.

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