



# FARMACIST

**NEWS**  
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2023



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- Planting preparation
- Case study: Variable Rate Technology
- N&P Budgets for sugarcane
- New grazing minimum standards
- Next round for Farmacist Connect now open
- Sodic vs dispersive soils
- Waterlogged soybeans



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# Farmacist Staff Updates

we say goodbye to old friends and welcome some new ones to the team!

*Hello...*

*and farewell*



**Samuel Krekeler**  
Burdekin



**Ashlee Reddacliff**  
Burdekin (transferring from Mackay)



**Mika Rowston**  
Travelling



**Nakita Cally**  
Burdekin



**Daniel Knowles**  
Far North



**Nikala Passaris**  
Consulting



**Daniel New**  
Mackay



**Bill Moffatt**  
Mackay



**Sarah Williams**  
Research



**Caitlyn Kitchin**  
Mackay



*Congratulations*

**Evan Shannon**

**10 years at Farmacist!**

# Planting time is fast approaching

## Good preparation and planning is essential!

By Evan Shannon

As we get closer to our planting period in the Burdekin, there are a number of important factors that need to be considered before the planting operation begins, including:

- **Plant source:** Are the plants still standing and what is that state of the eyes on the billets? Has the seed source had an RSD check? If not, contact your productivity service as soon as possible. Do you have a back up seed source? If using ratoons, then ideally use a seed source that is less than 10 months of age.
- **Calibration:** Make sure that applications of fungicide, insecticide and fertilisers are properly calibrated before planting begins.
- **Soil test and NMP:** Do you have a soil test on the fallow blocks and who is developing your nutrient management plan?
- **Wild Sorghum:** If planting on a block likely to have Wild Sorghum issues, then planting into moisture will be problematic. It is easier to use Paraquat based mixtures to control young sorghum seedlings than Asulam mixtures.
- **Variety:** Consider the variety selection and try to keep the maximum proportion of any variety to 40% of the total. For some growers this will be difficult but one needs to recognise that a large proportion of any variety is a potential risk.
- **Bed health:** Has your fallow ground survived the rains or are the beds in need of some attention?
- **Machinery and maintenance:** What is the state of your planter? Does it need some additional maintenance? If using a contractor, have you been in contact with them?
- **Weed management:** What is your likely weed control plan for the fallow and then for the young plant cane? Remember that Pendimethalin (Stomp Xtra®) will be more robust on hard to kill grasses than S Metolachlor (Dual Gold®) and will stay in the paddock. 🌱



## Craig Day - EOJ Advanced Spray Chemical Course



Register your interest now for Craig Day's Advanced Spray Application to save your place! Topics to be covered include spray drift, water quality, boom setup, and tank mix partners. Dates will be confirmed closer to the event, but the course will take place in these locations during the weeks of:

**29th May - 2nd June: Burdekin Region**

**5th June - 9th June: Mackay/Proserpine Region**

**Contact your Farmacist Agronomist or nearest Farmacist office to express your interest in attending - these are very informative and practical courses with limited places available.**

# Col Bourke - champion grower!

## Advocate for good chemical records

By Ashlee Reddcliff

Colin Bourke (Canegrowers BMP Accredited grower) grew up on the family farm near Carmila and has made a career of sugarcane farming since 1988. Col has seen and made a lot of changes to the way he grows cane over the years on his 80ha farm. Cutting green, changing row spacing and cultivation methods have all been adopted in the continual process of improving productivity. Now, Col is one of Project Bluewater's champion growers when it comes to record keeping.


Col went through a chemical compliance audit with the DAF staff in 2020. The audit was a bit stressful and highlighted a number of areas for him to address. Not long after, Col attended a Plane Creek Productivity Services herbicide workshop where he heard about Project Bluewater from Farmacist staff. He signed on to the project and commenced working with Adam Keilbach.

**“It was just brilliant! Adam came in and set us straight... It really just took the pressure off us,” said Col.**

A boom-spray assessment was completed, with the GBRF funded project providing parts to upgrade the machine with new compliant nozzles. Adam also worked with him to develop a pesticide management plan. This resulted in some changes to his herbicide program so that he was compliant with buffer zones near creeks, timber lines and on sloping country. The plan also included the most up-to-date information on regulations and product label changes.

In 2021 Col got re-audited and passed with flying colours. He is now one of Project Bluewater's champion record keepers. By jotting down notes in a notebook and transferring them into a Canegrowers chemical record book, Col finds this method the most efficient for him. He records all of the necessary information at the time of spraying such as weather conditions, chemical rates and sprayed area, and later that day adds all other information into the Canegrowers supplied record book.

Although doing it right takes a little bit longer, he says it's straight forward and simple. In the future, though, Col indicated he will be keen to move to electronic record keeping and is excited to see what role Farmacist will play with their streamlined digital record keeping app, Farmacist Connect.

Contact Farmacist today to receive a fully compliant chemical record book (sugarcane or grazing), or to see if you are eligible to join Project Bluewater to receive 12 months of pesticide advice and large range of services. 



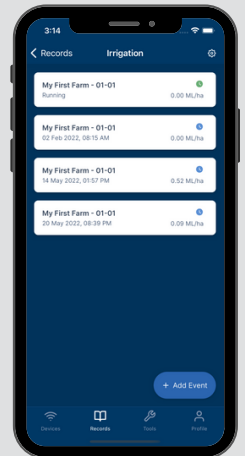
### Farmacist Connect

Farmacist Connect, an app made by Farmacist for growers, addresses all the requirements needed for accurate record-keeping and regulatory compliance.

It will eliminate the need for transferring records as the app can be used on both Android and iOS smart phones, so it will always be at your fingertips.

With a single app, you can keep track of:

- Chemical application records
- Nutrient application records
- Irrigation management
- Whole-farm management, including complementary and fallow cropping cycles
- Sugarcane, grazing, legumes and more!



The app is designed to be extremely user-friendly while still delivering on record-keeping capabilities. Farmacist Connect is currently in its beta phase, but the full release is hopefully just around the corner. Farmacist is also taking expressions of interest from those who are looking to start their digital record-keeping journey who would like to participate in the next round of the beta testing phase.

Contact your nearest Farmacist office or talk to your agronomist for more information about Farmacist Connect and how you can join to test out digital record keeping!

Project Bluewater is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation, and Farmacist Pty Ltd.



Great Barrier  
Reef Foundation



# N&P budgets for sugarcane

By Billie White

**N&P budgets were introduced in late 2019 but were not compulsory until the 2022 season. From December 2021, all sugarcane growers in the Wet Tropics, Burdekin, and Mackay-Whitsunday regions are required to have an N&P budget.**

It is compulsory to have a nitrogen (N) and phosphorus (P) budget for the 2023 season before applying any fertiliser to sugarcane.

## What is an N&P budget?

An N&P budget is the total calculated kilograms (kg) of nitrogen and phosphorus that you can apply to your sugarcane area (excluding fallow). Soil sample data and the SIX EASY STEPS (6ES) are used to calculate these amounts.

However, there is now added flexibility about where you can apply N and P; if you do not exceed your total calculated amount of N and P applied to the farm, the rates applied to each block are not regulated. An N&P budget also includes management zone maps if it is deemed that the farm requires different management zones.

N and P can be moved around the farm to suit block requirements. Do you have a lower yield potential in late cut or older ratoons and want to invest more nutrition in your plant cane or early ratoons? Nutrient can be moved from low returning blocks to high performing areas. If you are comfortable with your farm productivity after fertiliser application according to your 6ES recommendation, there is no requirement for you to move N and P around your farm.

## How do I prepare an N&P budget?

The first N&P budget (and every 5th year thereafter) needs to be developed by an *Appropriate Person*. An *Appropriate Person* is a person with professional qualifications, training, skills, or experience relevant to completing an N&P budget. However, as a grower, you can update your own N&P budget for the following 4 years. A grower may be their own *Appropriate Person* if they demonstrate that they have the appropriate skills, qualifications and/or experience to develop an N&P budget. You do not need to be an *Appropriate Person* to update your budget.

## How can I use an N&P budget?

An N&P budget allows you to manage according to priorities. You can use your budget to have one fertiliser rate across your top dress for your plant cane or minimise the fertiliser rates across your ratoons. Keeping track of your fertiliser applications through the season will help gauge how much N and P you have remaining in your budget towards the end of the season. It also gives you the opportunity to change rates in response to any variations you made in your initial plan. This ensures you remain within the allowable limits of your N&P budget.

For example, if you planned to use a blend with sulphur and accidentally ordered the same blend but without sulphur (and applied it at the same rate) the N% will likely be higher, resulting in a higher than intended N rate being applied. Catching this early means you can potentially reduce the N rate on a late cut ratoon, bringing your total N (kg) used within the allowable limit. The regulatory changes means that if total N applied to the farm is within the calculated amount for the farming area, growers are compliant. 🌱

## Things to know!

- If you apply mill mud or mill mud/ash mixtures at 100t/ha or higher, you must take this into account when calculating your N and P application amounts for that paddock.
- District Yield Potential: If you are in the Burdekin where there is more than one DYP (150t/ha and 180t/ha), you need to have historical yields showing three blocks that have yielded above 150t/ha in the last 15 years to use the 180t/ha DYP N rates.
- Soil samples must be taken prior to applying planting fertiliser and are valid for 12 months after the sampling date. For more information, please see the following: <https://www.qld.gov.au/environment/agriculture/sustainable-farming/reef/reef-regulations/producers/sugarcane>

# NSW soils workshop wrap-up

**Farmacist Agronomist Shannon Byrnes (Mackay) travelled to our Northern NSW office in January to provide a tailored soils workshop to our tea tree growers in conjunction with Farmacist's NSW Tea Tree extension officer Alice Moore.**

Growers were exposed to many basic soil principles including soil structure and chemical components, before heading outside with a soil sample from their own paddock to complete some 'at home' tests enabling the practical side to soil science.

A review on how the recent flooding and waterlogging may have affected the soil was also discussed, along with exploring some of the nutrient availability and removal data available to the tea tree growers. We had great feedback on the day and are looking forward to the events that are coming up in NSW in the coming months!

**23rd Feb: Knowledge to Know How Forum**

**26th April - 3rd May: Fully funded Chem Cert training**

**15th May: Biosecurity Workshops**

Contact Alice Moore on 0402 924 955 or email [alicew@farmacist.com.au](mailto:alicew@farmacist.com.au) for more information. 🌱



# Grazing minimum standards

By Katelin Reddacliff

Recently, new regulations have been introduced governing grazing enterprises within the catchments. These are much like the regulations governing the cane industry (introduced in 2009) on nutrient and chemical management within the Great Barrier Reef catchment regions.

Under the Reef protection regulations, all graziers in the Mackay Whitsunday, Wet Tropics, Burdekin, Fitzroy, and Burnett Mary regions are now required to comply with minimum practice agricultural standards and keep general records.

## What is the minimum practice agricultural standards?

The minimum practice agricultural standards require graziers to assess their ground cover on 30th September each year and keep a record of their findings.

Although the agricultural standards only require you to assess and keep records of ground cover, from a productivity and sustainability point of view, it is also a good idea to monitor land condition through assessing the productivity of your pasture, soil and woodland thickening. There is an ABCD framework that helps graziers assess their current paddock condition (listed below).

Class	Good (A)	Fair (B)	Poor (C)	Degraded (D)
<b>Pasture</b>	<b>Excellent:</b> <ul style="list-style-type: none"> <li>&gt;80% pasture is 3P species</li> <li>Large tussocks, close together and healthy</li> <li>Few weeds and no significant infestations</li> </ul>	<b>Good:</b> <ul style="list-style-type: none"> <li>60–80% of pasture is 3P species</li> <li>Large tussocks, some gaps between and healthy</li> </ul>	<b>Poor:</b> <ul style="list-style-type: none"> <li>10–60% of pasture is 3P species</li> <li>Small tussocks, more noticeable gaps, unhealthy plants</li> </ul>	<b>Very Poor:</b> <ul style="list-style-type: none"> <li>&lt;10% of pasture is 3P species</li> <li>Very small tussocks, large gaps between, dead looking plants</li> </ul>
<b>Soil</b>	<b>Stable:</b> <ul style="list-style-type: none"> <li>Good soil condition</li> <li>No erosion</li> <li>No visual evidence of soil movement</li> </ul>	<b>Slight Disturbance:</b> <ul style="list-style-type: none"> <li>Some decline in soil condition</li> <li>Some signs of previous erosion and/or current susceptibility to erosion</li> <li>Soil surface compaction, crusting, cattle pads affecting water movement</li> </ul>	<b>Moderate Disturbance:</b> <ul style="list-style-type: none"> <li>Obvious signs of past erosion and/or high susceptibility to erosion</li> <li>Plant pedestalling, sheet or rill erosion, soil mounding on obstacles</li> </ul>	<b>Severe Disturbance:</b> <ul style="list-style-type: none"> <li>Severe erosion or scalding, resulting in hostile environment for plant growth</li> <li>Runoff concentrated in channels, scalds, bedrock at surface, sheet or rill erosion &gt;15cm deep</li> </ul>
<b>Ground cover</b>	<b>Excellent:</b> >70% @ 30th September	<b>Good:</b> 50 - 70% @ 30th September	<b>Poor:</b> 20 - 50% @ 30th September	<b>Degraded:</b> <20% @ 30th September
<b>Woodland thickening</b>	No sign or early sign of woodland thickening	Some thickening in density	General woodland density thickening	Thickets of woody plants cover large areas

**There are 4 standard conditions to the minimum practice agricultural standards:**

**1. If your paddock is in good (A) or fair (B) condition:**

- You are required to continue using measures to maintain the land in good or fair condition.



**2. If your paddock is in poor (C) condition:**

- Measures must be implemented to improve land condition towards achieving good or fair condition.
- Does not mandate any particular action or measure, up to the grazier to determine appropriate measures.



**3. If your paddock is in degraded (D) condition:**

- Measures must be implemented to improve land condition towards achieving good or fair condition, or prevent areas from further degradation or expansion.
- However, it is understood that it may not be possible to achieve 50% ground cover at 30th September each year, or that it may be cost prohibitive to improve some areas of degraded land. Therefore, measures must be implemented to prevent further degradation or expansion.



**4. General minimum standard records** must be made within 3 business days, kept for at least 6 years, and be made available upon request. Minimum standard records include:

- Notes about measures taken to retain or improve land condition
- Details of the measures taken
- Dates the measures were implemented
- Location of the property (relevant paddock) or whole property where the measures were implemented

**What are the general records you need to keep?**

- Name of person carrying out the activity and person making the record
- Company name (if applicable)
- Property and postal address
- Farm identification number/s (if applicable)
- List of lots included on all of the farms within the agricultural enterprise
- Records of agricultural chemicals, fertiliser, and mill mud/ash applied and specifically:
  - Location of each application
  - Date of each application
  - Agricultural chemical and/or fertiliser product applied to each location with product name, rate and (for fertiliser) Product % of nitrogen and phosphorus (N and P).

**When do the regulations apply?**

- Wet Tropics, Burdekin, Mackay Whitsunday, Fitzroy and Burnett Mary regions are required to keep general records now as well as comply with the minimum practice agricultural standards (Cape York - exempt as the region has met water quality targets).

<https://www.qld.gov.au/environment/agriculture/sustainable-farming/reef/reef-regulations/grazing>



**How can Farmacist help?**

- Help set up monitoring sites
- Aid in ground cover and land condition assessments
- Grazing land condition management plans
- Record keeping books – nutrient and chemical

If you would like more information on improving your pastures or to discuss grazing minimum standards, please contact the Farmacist Grazing Team (Mackay) on (07) 4959 7075.

# Using Variable Rate Technology to address common soil constraints



By Zoe Egger



## Introduction

In coastal cane-growing locations, paddock yield variability is a common occurrence. The reasons for this variability can range from soil limitations, to location in the landscape, to uneven irrigation application, to inappropriate nutrient and chemical applications.

The Point of Difference (POD) Project, funded by the Great Barrier Reef Foundation and Farmacist aims to increase grower understanding of the interaction between these variables that influence crop growth. By utilising precision agriculture technologies and practices, and proven science-based principles, the project is helping growers develop management strategies to increase their productivity while maintaining positive water quality outcomes.

## Background

**In the Mackay region, sodicity and salinity are two of the most common soil constraints that affect cane yield.**

Sodic soils occur when the sodium concentration is greater than or equal to 6%<sup>1</sup> of the total concentration of salts present in the soil (measured as an ESP[%]<sup>2</sup>). The large sodium ions attach themselves to clay particles, negatively impacting soil structure. High levels of sodium cause clay particles to disperse when wet, resulting in sealing and crusting of the soil surface and a dense subsoil which resists root and water penetration.

Saline soils are those that have a high concentration of soluble salts in the soil solution (the degree of salinity is measured by Electrical Conductivity [EC]). These salts can be a combination of a number of ions but sodium chloride is the most common. Salinity restricts growth by reducing the amount of water available to the plant.

Tony Bugeja and his son Mark farm 330 hectares of cane in the Homebush-Rosella area south of Mackay. While harvesting, they noticed considerable yield variability in a particular paddock (figure 2) and were interested in determining the cause in order to fine-tune subsequent nutrient management practices.



Figure 1: Aerial footage of paddock used to determine yield variability.

## Methodology

Using drone footage, Farmacist could pinpoint the exact locations of these lower yielding areas in the paddock (see figure 1). These regions were marked with a GPS, so they could be monitored over time.

From these identified regions and by utilising soil and EM maps, two sampling locations were determined and soil cores were taken to a depth of 80 cm in the profile. A sample from each 20cm increment was sent away for analysis.



Figure 2: Side view of paddock variability at harvest.



**Results**

**Soil test results:**

Farmacist agronomist Zoe Egger determined the cause of the yield decline was due to sodicity as indicated by the soil test results, in particular the exchangeable sodium percentage (ESP%) , which is a measure of the amount of sodium in the cation exchange sites.

As outlined by Sugar Research Australia, ESP% at levels greater than 6% affects cane yield. In the Central region, a 1% increase in subsoil ESP results in 1.4 tonne/ha cane yield reduction (in the Burdekin region, this increases to 2.4 tonnes/ha reduction per 1% increase in subsoil ESP).

Nearly all soil tests undertaken on both sites indicate sodium at levels that would reduce cane yield, with the northern site having greater potential for yield reduction (Table 1).

**Action plan**

Once the final ratoons have been harvested and the block is fallow, the EM (electromagnetic) map to be produced by Farmacist will help determine boundaries of the different soil zones, while the geo-referenced soil samples taken from multiple zones will determine where the sodicity starts and finishes.

From this information, a variable rate map can be developed for application of ameliorants to treat the low-producing areas.

Historically, a calcium source is applied to affected paddocks to replace the exchangeable sodium in the soil, allowing it to be leached below the root zone. Traditionally, gypsum (calcium sulfate) is the best and most economical source of calcium to apply to soils with a pH greater than 6.

However, gypsum is itself a salt and if it is applied to soils that already have high salt levels (chloride in particular) it can cause increased salinity.

For soils with a pH less than 5.5, lime (typically calcium carbonate) is the preferred option as pH also needs to be addressed. It is also important that the block has correct drainage and has been laser levelled (if required) before applying a treatment of calcium, otherwise the dispersed sodium ions cannot drain away effectively.

Growers who farm near a sugar mill also have access to mill ash and mill mud (by-products from the sugar milling process). These by-products add organic matter to the soil to make it more porous and will therefore improve the amount of water available to plants.

The mill by-products, especially mill ash, have significant potassium concentrations that also help disperse the sodium ions. A mill mud/ash combination is often the preferred alternative for treatment because of the relatively low cost per hectare (in comparison to gypsum and lime) and their contribution to boosting levels of other nutrients like phosphorus.

Paddock variability is common but, through precision agriculture, growers and advisors can fine tune management to increase profitability and productivity. In cases such as this one at Tony and Mark Bugeja’s, lower yielding sections of blocks can be managed with variable rate fertiliser until the block becomes fallow, and that is when the real remediation work can begin.

Poor patch 1 (north)	ESP%
0-20 cm	6.41
20-40 cm	8.18
40-60 cm	9.13
60-80 cm	11.21
Poor patch 2 (south)	ESP%
0-20 cm	5.1
20-40 cm	7.2
40-60 cm	6.83
60-80 cm	6.62

Table 1: Soil test results for two poor growth areas.



**Point Of Difference and Precision to Decision is funded by the partnership between the Australian Government’s Reef Trust and the Great Barrier Reef Foundation, and Farmacist Pty Ltd.**

<sup>1</sup> Sugar Research Australia. (2020). *Sodic Soils*. <https://sugarresearch.com.au/growers-and-millers/nutrient-management/six-easy-steps-toolbox/refining-nutrients-for-specific-circumstances/sodic-soils/>

<sup>2</sup> Exchangeable Sodium Percentage (%)



# Sodic vs dispersive soils - are they the same?

By Heidi Hatch Gordon

**It's a traditional misconception that sodicity and dispersive soils are the same thing. However, this is not always the case as not all sodic soils are dispersive and not all dispersive soils are sodic.**

## What are the dispersive soils?

The two main processes responsible for the deterioration of soil structure are slaking and dispersion. Slaking is the initial break down and collapse of small soil clods (known as aggregates) when they are wet. Whereas dispersive soils are the complete breakdown into single particles (sand, silt, and clay) that disperse into solution when wet (NSW Government, 2000). This gives the 'milky coffee' appearance.

## What causes soil dispersion?

Soils disperse when the attractive forces between the soil particles are no longer strong enough to hold them together. What causes this? Well, there is no universal relationship but, in most soils, it is a contribution of three factors: soil texture, soil chemistry and management practices. Properties which can decrease soil stability include:

- Soils with 10-35% clay (Moore, 2001)
- High exchangeable sodium (ESP) – sodic soils\*
- Low salt concentration in soil solution\*
- Low calcium:magnesium ratio (<2:1), high magnesium percent (>30%) (GRDC 2020)
- Low organic matter
- History of working
- Speed of wetting (Hazelton & Murphy 2016)

\* A high EC can overcome the dispersive effects of high ESP and whether clay particles are flocculated or dispersed is often determined by the balance of these factors.

## Impacts to your soil and crops

Dispersive soils are very unstable and the collapse of soil structure when wet can:

- Develop a surface crust or hard clods once dry
- Reduce seedling/plant cane emergence
- Reduce water infiltration/soakage therefore reducing water storage after each irrigation/rainfall event
- Reduce soil aeration meaning less oxygen for plant roots and microbes (GRDC 2020).
- Difficulties of effective cultivation (Donnollan, T.E. (1991).

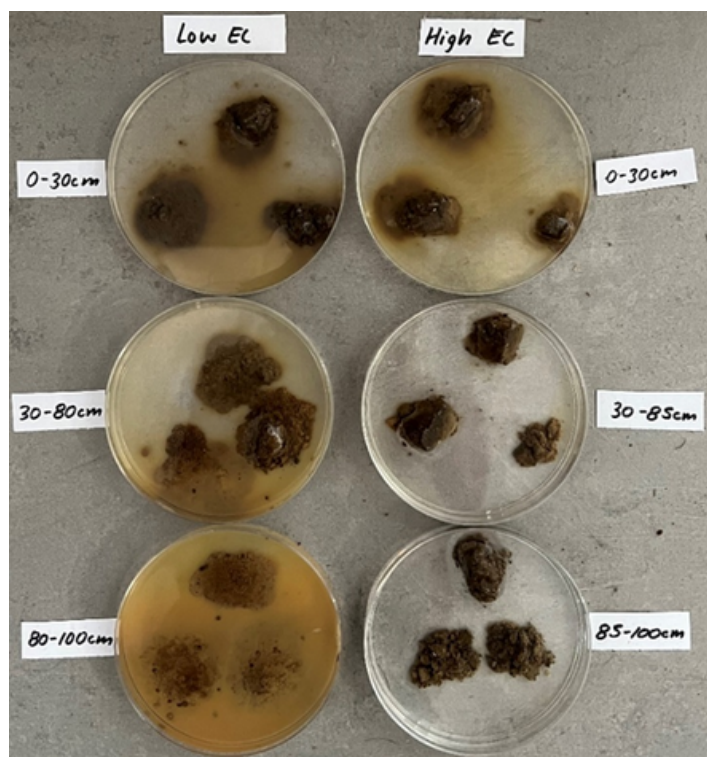
## Identifying dispersive soils

In the paddock after rain, dispersive soils may appear as 'milky coffee' puddles, have a 'crust' like appearance and/or have difficulty working.

Back in the shed, a relatively quick test can be set up using a bottle of distilled water (or rainwater) and a series of clear containers the size of your palm or bigger (eg. petri dish, glass jar/cup, plastic plate). Ensure the soil is air dry as the EC of soil solution can greatly influence dispersion.

Take at least three small clods of dry soil (3-5mm in diameter) and place them in a dish of distilled water (or rainwater) ensuring the clods are fully covered and protected from the wind. If the water turns cloudy, the soil is dispersive (NSW Government, 2000). The cloudier the water turns and the speed with which it turns cloudy, the more dispersive is the soil. The samples should be checked at 10 minutes, 2 hours, and 24 hours.

If the sample crumbles but does not go cloudy, the soil has slaked not dispersed (GRDC 2020). Further investigation can be done if the soils do not disperse. They can be retested but this time by wetting the soil with distilled water and remoulding the clods. This is done in an attempt to replicate soil conditions after cultivation. The test can be performed with soil from various parts of the paddock from different depths (see photo below).



To put a number on the degree of dispersion, soil samples can be sent to the laboratory. The Precision to Decision (P2D) project is currently using the Loveday & Pyle method (Index 0 to 16, with the larger number indicating the more dispersive soil). However, there are other dispersion tests including Emerson aggregate and ASWAT test (Moore, 2001).

It must be noted that in-house dispersion tests are done using small aggregates, whereas the lab tested ESP results are obtained from a bulk sample. Farmacist has noticed different aggregates from the same sample have behaved differently when wet (eg. some aggregates may disperse whereas others do not).

## Burdekin Preliminary Results

The Burdekin Precision to Decision (P2D) project has conducted quick, in-office dispersion tests on hundreds of soil samples in the last two years. These samples are also then sent to the laboratory for complete analysis. Since 1st Nov 2022, 88 top soil (0-20cm) and 90 sub soil (50-60cm) samples have been analysed by the lab to calculate the degree of dispersion and determine the driving factors.

The 2022/2023 fallow topsoil sample results of particular interest included sodic soils that did not disperse, and dispersive soils that were not sodic. Driving factors are summarised below:

Sodic & Non-Dispersive (n=3)		Non-Sodic & Dispersive (n=18)	
Number of Samples	Driving Factor	Number of Samples	Driving Factor
3/3	Exchangeable Sodium Percent > 6%	0/18	Exchangeable Sodium Percent > 6%
2/3	Electrical Conductivity (1:5 water) > 0.4	17/18	Electrical Conductivity (1:5 water) < 0.10
2/3	Organic carbon > 1%	14/18	Clay content < 30%
2/3	Clay content > 30%	12/18	Organic carbon < 1%
1/3	Calcium: Magnesium > 2	11/18	Magnesium > 30%
		8/18	Calcium: Magnesium < 2

Donnolan, T.E. (1991). *Understanding and Managing Burdekin (BRIA) Soils*, Department of Primary Industries Queensland Government.

GRDC. (2020). *Dealing with dispersive soils fact sheet*. <https://grdc.com.au/resources-and-publications/all-publications/factsheets/2020/dealing-with-dispersive-soils-fact-sheet>

Hazelton, P., & Murphy, B. (2016) *Interpreting Soil Test Results: What do all the numbers mean?* (3rd ed.). CSIRO Publishing.

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NSW Agriculture (2000), Chapter D4. Slaking and dispersion. In Munroe, A (Eds.), *SOILpak for vegetable growers* (pp. D4.1-D4.6). NSW Agriculture. [https://www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0008/127277/Slaking-and-dispersion.pdf](https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0008/127277/Slaking-and-dispersion.pdf)

**Point Of Difference and Precision to Decision is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation, and Farmacist Pty Ltd.**



# Waterlogged soybeans - what to expect

By Zoe Egger



Waterlogging can be detrimental to crops in a number of ways, including:

- Development of soil-borne diseases such as phytophthora and stem rot
- Reduced nitrogen fixation and death of nodules
- Reduced plant respiration and energy production due to lack of soil oxygen
- Reduced nutrient availability due to leaching or denitrification
- Collapse of soil structure

## What can you do to help crops recover?

Research into soybean and other broadacre crops have shown that a nutrient application can be beneficial in helping crops overcome waterlogging once waters have receded. Waterlogging greatly affects the availability of nitrogen, iron and zinc, so a fertiliser that contains these elements would be suitable.

If root function is reduced, a foliar application may be the best option, taking care to follow recommended rates and avoiding application during the heat of the day so that leaves are not damaged by fertilizer burn.

**For further advice regarding waterlogging, soybeans or nutrient recommendations, please contact your experienced local Farmacist Agronomist.**

# Managing pachymetra root rot

By Belinda Billing

## What is pachymetra?

Pachymetra (*pachymetra chaunorhiza*) is an oomycete, a fungus like organism, native to Australia. It was discovered by BSES in North Queensland in the early 1980s during studies into yield decline and what was known as northern poor root syndrome.

Pachymetra is found in all Australian sugarcane soils, however is more common in the wet and humid regions where it flourishes (a lot less is found in the Burdekin). When assessing soils for pachymetra spores are counted and the results presented as spores per kilogram of soil.

## Symptoms

A high pachymetra spore count results in gappy cane and can greatly reduce potential yield. Losses of up to 40% in susceptible varieties have been measured. Infected roots are soft, rotten, and smaller and less developed than those in healthy cane. This reduces the plant's ability to absorb moisture and nutrients and makes it susceptible to stool tipping. This can appear like a canegrub infestation, however pachymetra will not respond to Imidacloprid and such crop issues should always be investigated prior to application of any treatment.

While pachymetra favours sandy and loamy soils, it is found in all soil types. Because pachymetra impacts on the cane roots, symptoms are similar to other common issues such as water logging, drought or poor nutrition and so the infection can go undetected and unmanaged.

## Assessing pachymetra infections

To assess for pachymetra sample the soil in the cane row at 0 to 25cm. It is recommended to sample at least eight to ten sites within a field. Samples can also be taken from a fallow field with a variation applied to the assay assessment to account for the distribution of the spores when the soil has been worked. Table 1 shows the expected impact of spore count ranges found in soil assays from standing crops and fallow fields.

Test for pachymetra:

- In blocks with varieties rated as Susceptible or Intermediate to pachymetra,
- When your crop is poor and/or has weak rooting (susceptible to tipping).

Table 1: Understanding your pachymetra results

Likely severity	Fallow field	Standing crop
Low	0 - 30,000 spores/kg soil	0 - 50,000 spores/kg soil
Medium	30 - 60,000 spores/kg soil	50 - 100,000 spores/kg soil
High	>60,000 spores/kg soil	>100,000 spores/kg soil

Note: Resistant varieties should be planted once the spore count is over 50,000 in a standing crop.



## Management

Testing early will ensure you have time to coordinate the most appropriate planting materials. For example if you plan on taking a block to fourth ratoon, taking a test at third ratoon allows time to source clean seed for your preferred planting variety.

Table 2: Pachymetra spore counts from samples in FNQ with variety, crop age and soil type

Spore count /kg soil	Variety/ crop age	Previous Variety	Soil Type
976,891	Q253 <b>R</b> / 4R	Q208 <b>I</b>	Babinda (peat over clay)
174,256	Q238 <b>R</b> / 3R <b>R</b>	Q200 <b>I</b>	Kirrama (black Sand)
2,055,536	Q183/RP <b>R</b> (3 mths)	Q208 <b>I</b>	Kirrama (black sand)
1,059,658	Q208 <b>I</b> / 5R <b>I</b>	Q200 <b>I</b>	Thorpe (clay loam)
1,020,360	Q208 <b>I</b> / 2R <b>I</b>	Q200 <b>I</b>	Babinda (peat over clay)

Note: **I** indicates Intermediate resistance to Pachymetra and **R** indicates Resistance. Note that where an intermediate variety has been grown in the previous crop, the spore count will still be high when resistant varieties are grown. It is highly likely that intermediate varieties have been grown in succession

The only way to reduce a high pachymetra spore load is through planting resistant cane varieties. Fallows of less than 12 months and exposing soil to sunlight through tillage have very little impact. Planting intermediate varieties in succession allows the spore count to increase, as can be seen in table 2. Once a resistant variety is planted it takes time for spore numbers to reduce, spores can last up to 5 years in soil. Resistant varieties may be less impacted and over time (in some instances more than one crop cycle) the spore count will drop, eventually allowing for the rotation of intermediate varieties.

Growers in the Far North are embracing newer varieties such as SRA26 and SRA28 that are resistant to pachymetra and are also looking to highly resistant varieties such as Q183 to drive down accumulated high spore loads. Speak to your local agronomist for variety advice that suits your farm. 🌱

# What are your weeds telling you about your soil in FNQ?

By Belinda Billing

While weeds are a costly and time consuming problem for most farmers, they can also reveal information about your soil and localised conditions. Being able to 'read your weeds' can help you to understand and manage your land.



Common weeds can indicate high or low pH, wet conditions, and excess or limited nutrients, reflecting the conditions they have evolved in. Addressing the conditions that favour a weed may improve your crop and reduce weed pressure, for example improving drainage in an area where sedge and nutgrass are thriving.





While it is always recommended to take soil tests for detailed information on your crop nutrition, there are some signs to look out for to understand your weeds and what might be going on below the surface.

- Weeds with strong and deep tap roots indicate poor fertility and are adapted to bring minerals to the surface where they can be utilised by other plants.
- Weeds that are short on top with a thick strong tap root below break up compaction, and you'll often find them on headlands, in wheel tracks or around car parks.
- Weeds with masses of fine roots are soil tillers and indicate poor soil structure.
- Nitrogen fixing legume weeds regulate nitrogen up and indicate low nitrogen levels in the soil.
- Fast growing weeds with large broad leaves are often an indication of excess nitrogen. They can take it up quickly and release it slowly after dying. Vine weeds that sprawl over large areas are also attempting to spread the nitrogen they have absorbed.

Reference: Jones, G (2021) *Need to Read the Weed*, [https://reefcatchments.com.au/files/2021/12/2021\\_Gwyn-Jones-Need-to-Read-the-Weed.pdf](https://reefcatchments.com.au/files/2021/12/2021_Gwyn-Jones-Need-to-Read-the-Weed.pdf)

Below are a few common weeds and what they indicate about where they are growing.

Weed	Comments	Images
<ul style="list-style-type: none"> <li>• Thistles</li> <li>• Chickweed</li> <li>• Pigweed/Purslane</li> </ul>	<p>Indicate fertility. These weeds love nitrogen and can indicate excess nitrogen. They tend to grow in neutral soils, disliking acid conditions.</p> <p>Chickweed can grow in compacted soils. Pigweed can indicate high phosphorus content.</p> <p><i>Image credits</i> Thistles, Chickweed: ABC Gardening Australia, <a href="https://www.abc.net.au/gardening/how-to/read-your-weeds/12745698">https://www.abc.net.au/gardening/how-to/read-your-weeds/12745698</a> Purslane: <a href="https://communitygarden.org.au/2018/10/purslane/">https://communitygarden.org.au/2018/10/purslane/</a></p>	
<ul style="list-style-type: none"> <li>• Capeweed</li> <li>• Stinging nettles</li> </ul>	<p>Indicate a nutrient-rich, cultivated soil. If growth is stunted or leaves are yellowed, nitrogen could be lacking.</p> <p>Stinging nettle will favour acidic soils.</p> <p><i>Image credits</i> Stinging nettles: ABC Gardening Australia, <a href="https://www.abc.net.au/gardening/how-to/read-your-weeds/12745698">https://www.abc.net.au/gardening/how-to/read-your-weeds/12745698</a> Capeweed: <a href="https://www.myhometurf.com.au/lawn-tips/how-to-get-rid-of-capeweed/">https://www.myhometurf.com.au/lawn-tips/how-to-get-rid-of-capeweed/</a></p>	

Weed	Comments	Images
<ul style="list-style-type: none"> <li>• Sensitive weed</li> <li>• Sesbania</li> <li>• Siratro</li> <li>• Clover</li> <li>• Other nitrogen fixing weeds/legumes</li> </ul>	<p>Can indicate soil is lacking in nitrogen.</p> <p><i>Image credits</i>                      Sesbania, Sensitive Weed: <a href="https://commons.wikimedia.org/wiki/File:Sesbania_cannabina_seedling.jpg">https://commons.wikimedia.org/wiki/File:Sesbania_cannabina_seedling.jpg</a>                      Clover: <a href="https://www.myhometurf.com.au/lawn-tips/how-to-get-rid-of-capeweed/">https://www.myhometurf.com.au/lawn-tips/how-to-get-rid-of-capeweed/</a></p>	 <p>The images in this section show various weeds. The top image is a dense patch of green plants. The middle image shows a purple flower on a green stem. The bottom image shows a green trifoliate leaf on a dark soil surface.</p>
<ul style="list-style-type: none"> <li>• Dandelion</li> <li>• Flatweed</li> <li>• Onion grass</li> <li>• Crows foot grass</li> <li>• Asthma</li> </ul>	<p>Are happy in poor soils that lack structure. Can grow in compacted soil.</p> <p>Dandelion can indicate low calcium and is able to bring calcium from depth to the surface via a strong tap root.</p> <p><i>Image credits</i>                      Flatweed, Onion grass, Crows foot grass: ABC Gardening Australia, <a href="https://www.abc.net.au/gardening/how-to/read-your-weeds/12745698">https://www.abc.net.au/gardening/how-to/read-your-weeds/12745698</a>                      Dandelion: <a href="https://www.abc.net.au/news/health/2016-05-12/edible-weeds-and-how-you-can-use-them/7406004">https://www.abc.net.au/news/health/2016-05-12/edible-weeds-and-how-you-can-use-them/7406004</a>                      Asthma: <a href="https://commons.wikimedia.org/wiki/File:Sesbania_cannabina_seedling.jpg">https://commons.wikimedia.org/wiki/File:Sesbania_cannabina_seedling.jpg</a></p>	 <p>The images in this section show various weeds. The top image is a dandelion with yellow flowers. The middle image shows a dense patch of green grass. The bottom image shows a plant with purple flowers and green leaves.</p>
<ul style="list-style-type: none"> <li>• Dock</li> <li>• Plantain/Lambs tongue</li> </ul>	<p>Indicate an acidic, heavy soil.</p> <p>Dock can thrive in poorly drained soils. Plantain can grow in compacted soil with low fertility.</p> <p><i>Image credits</i>                      Dock, Plantain: ABC Gardening Australia, <a href="https://www.abc.net.au/gardening/how-to/read-your-weeds/12745698">https://www.abc.net.au/gardening/how-to/read-your-weeds/12745698</a></p>	 <p>The images in this section show dock and plantain. The top image shows a dense patch of green grass. The bottom image shows a plant with purple flowers and green leaves.</p>
<ul style="list-style-type: none"> <li>• Sedges</li> <li>• Nutgrass</li> </ul>	<p>Usually indicates a wet or waterlogged soil.</p> <p>Nutgrass usually prefers fertile soils with neutral pH</p> <p><i>Image credits</i>                      Sedges: <a href="https://www.researchgate.net/publication/349620133_Proposed_plant_host_test_list_for_assessing_risk_of_biological_control_agents_for_Navua_sedge_Cyperus_aromaticus">https://www.researchgate.net/publication/349620133_Proposed_plant_host_test_list_for_assessing_risk_of_biological_control_agents_for_Navua_sedge_Cyperus_aromaticus</a>                      Nutgrass: <a href="https://commons.wikimedia.org/wiki/File:Sesbania_cannabina_seedling.jpg">https://commons.wikimedia.org/wiki/File:Sesbania_cannabina_seedling.jpg</a></p>	 <p>The images in this section show sedges and nutgrass. The top image shows a dense patch of green grass. The bottom image shows a plant with purple flowers and green leaves.</p>

# Precision To Decision project review day

By Hannah Van Houweninge

On December 15th last year, the Farmacist FNQ team invited their Precision to Decision (P2D) project growers to have their say on the progress of project activities, services, and nutrient management plans provided in 2022. The focus of the project is to reduce DIN losses from our farming systems by providing sugarcane growers with nutrient management plans (NMPs), electromagnetic soil mapping, drone imagery, precision technologies, and agronomic advice.

## Why are project reviews important?

Project-based reviews provide opportunities to assess our progress and encourage greater communication within the team and between the partners. The process of reviews increases our responsiveness to act where needed and to approve and support areas that are well received. Feedback gives us future direction to improve our work and enables us to address problems efficiently, encourages grower engagement, and is critical if we want to make continual improvements.

## Independent Surveys

Independent surveys are a great tool to collect clear and impartial feedback. Prior to the day of review, an independent survey was conducted by Community Bred on 24 growers in total (45% of the project growers). Questions asked included topics like how did you hear of the project, reasons for joining, level of happiness with the engagement from staff and the NMP process, and what would improve the final product?

Results have shown that the P2D project is working well and Farmacist staff are highly regarded by the growers involved in the project. The P2D growers were more than satisfied with their nutrient plans and the team's efforts in all areas. The information collected was positive and constructive, with anonymous feedback such as:

“I follow it (NMP) to the letter due to the thorough consultation process.”

“Found them (Farmacist) very good — professional, sociable, approachable. Nothing is too difficult for them.”

“(I want the plan for) Compliance with Reef regulations. It's helpful to have an agronomist to guide this.”

“Book is in the tractor.”

“We need to record farm practices; reducing cost, reducing fertiliser use— I don't believe in wastage.”

“I was very happy with the support from Farmacist. They've been extremely helpful.”


The overall findings were optimistic and suggest Farmacist should maintain their engagement and performance strategies moving forward with the project. We would like to thank all our growers who participated in the event and the survey - both were a great success and have helped the team prepare to tackle the 2023 season. 🌱





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