NORTH QUEENSLAND PINEAPPLE STUDY GROUP

Burdekin region and Rollingstone

Thursday 31 March and Friday 1 April 2022

Take Home Messages

Some growers are moving towards separate weedicide applications rather than combining a number of herbicides in the same tank mix. In spite of the extra cost of separating some of the herbicides better knockdown results and less phytotoxicity is being achieved.

Choose the fumigant based on the situation. Results from the demonstration trials have found Telone is good against nematodes, chloropicrin is expensive but effective against Phytophthora root rot, and Metham is OK against Phytophthora root rot.

Two fact sheets have been produced thus far from the outcomes of two of the demonstration trials and are included in the appendices of these minutes. More will be prepared and made available.

A combined Growcom & DAF industry data project is being conducted to get more use out of the production data that is currently collected on behalf of industry. As always, no individual farm data will be shared beyond Simon and Bridie. Note that production data is being collected again by Bridie and Simon for the next round of estimates.

Two new herbicides have been registered but they can be phytotoxic and have not been adequately tested on pineapples. Growers are advised to exercise extreme caution and only try on small areas initially until more is known about them.

For further information or assistance with Reef Certification, Hort360 in general etc contact your local Growcom officer, **Phil Laycock**, Hort360 GBR officer, **0439 252 828** phillaycock@growcom.com.au

The combination of very acid soils with low cation exchange capacity (low nutrient holding capacity) and excessive or badly timed phosphorous acid applications is causing a deficiency in several minerals, especially calcium, resulting in calcium deficiency issues including a newly described russeting on the fruit that is called 'chocolate'

31 March - Burdekin

Present (8 + 5 + 6 = 19)

Growers (8): Ryan Pace, Jeffrey Pace, Peter Malone, Robert Pratt, Ronan White, Tony Accorsini, Stephen Scurr, Courtney Thies.

Host farmers (5): Dennis Pozzebon (cane grower demonstrating bioreactors), Mark and Aaron Linton (peanut growers and contractors), James and Tiffany Ware

Non-growers (6): Tim Wolens (Agri Supply Global), Bridie Carr, Simon Newett, Carla Wegscheidl, Carla Atkinson & Dale Fresser (DAF Qld).

Apologies: John Zelenka, Chris Berra & Doug Jones

1st April – Pace Farming

Present (18 + 6 = 24)

Growers (18): Stephen Pace, Ryan Pace, Jeffrey Pace, Hayden, Caitlin and Fletcher Marshall, Peter Malone, Robert Pratt, Ronan White and three other Pace employees, Tony Accorsini, Stephen Scurr, Courtney Thies, Chris Berra, Peter & Chloe Ottone.

Non-growers (6): Tim Wolens (Agri Supply Global), Bridie Carr & Simon Newett (DAF Qld), Richard Ward (Apunga farm recording software 0414 731 606 richard@apunga.com), Tom Masters (NESA fertilisers), Philip Laycock (Growcom).

Apologies: John Zelenka & Doug Jones.

AGENDA DAY 1

Thursday 31st March, Burdekin

9:30 am

Dennis Pozzebon, 61 Elisa Rd, Mt Kelly - sugarcane, precision agriculture, bioreactor.

MORNING TEA in the Pozzebon's garden

11:40 am

Aaron & Marl Linton, 286 Hurney Rd, Osborne, Home Hill - peanut enterprise.

LUNCH at Malpass Hotel, Home Hill

2:00 pm

The planned visit to mango and melon grower Brad Bowen had to be cancelled due to Covid.

Instead, we visited James and Tiffany Ware's farm, Stevens Rd, Kirknie where they have moved away from growing sugarcane to the cultivation of grain crops including pulses, sorghum and industrial hemp using a more sustainable and lower input approach.

DENNIS POZZEBON, SUGAR CANE GROWER, 61 ELISA RD, MT KELLY

Dennis farms 120 ha of sugar cane, taking over from his father who was the first farmer of this property.

Precision agriculture

Regulations are in place for fertiliser rates used on sugarcane in the Burdekin region not least because it is close to the Great Barrier Reef. Growers are limited to no more than 180 kg N/ha/crop. Dennis uses Trimble GPS for precision farming in combination with FarmWorks Software (a division of Trimble) for keeping his farm records. This

combination helps him to be more precise with his applications and to record them all so he can review his annual inputs and costs and also provide the reports needed.

Electro Magnetic (EM) mapping is carried out to identify sodic patches, wet spots etc. Farmacist Pty Ltd (agronomic solutions provider based in the Burdekin and Mackay) helps with this.

Discussing the use of variable rate fertiliser applications, Dennis pointed out that a poor patch of crop growth didn't necessarily mean that it needed a higher rate of fertiliser. Sometimes it was a high sodium patch and needed an application of gypsum to treat the sodicity, or perhaps it was a diseased patch and couldn't make use of the existing fertiliser.

Irrigation automation and remote control

Dennis's irrigation system is now fully automated and can be controlled remotely from anywhere in the world where there is Internet coverage. Although setting it up cost a lot of money it is only taking a few years to pay off because it saves time, energy and water. Already after 9 months he has saved 22% in water costs and 23% of energy costs.

Some of the irrigation pumps on the farm are solar powered.

There are pressure sensors within the reticulation system in the field which give warnings (delivered by the software) of low or excessive pressure in the pipes.

The whole system cost about $140 K and will take 5 to 10 years to pay off.

Bioreactor

With advice from Carla Wegscheildl, Dennis has installed a bioreactor on his farm to take a significant amount of nitrogen out of the water that leaves his paddocks, thus reducing the amount of nitrogen leaving the farm in creeks and underground water and helping him meet reef regulations targets.

Carla Wegscheidl at the site of the Mt Kelly bioreactor explaining how it works. This bioreactor captures runoff from the cane paddock on the far side of the red farm bike.

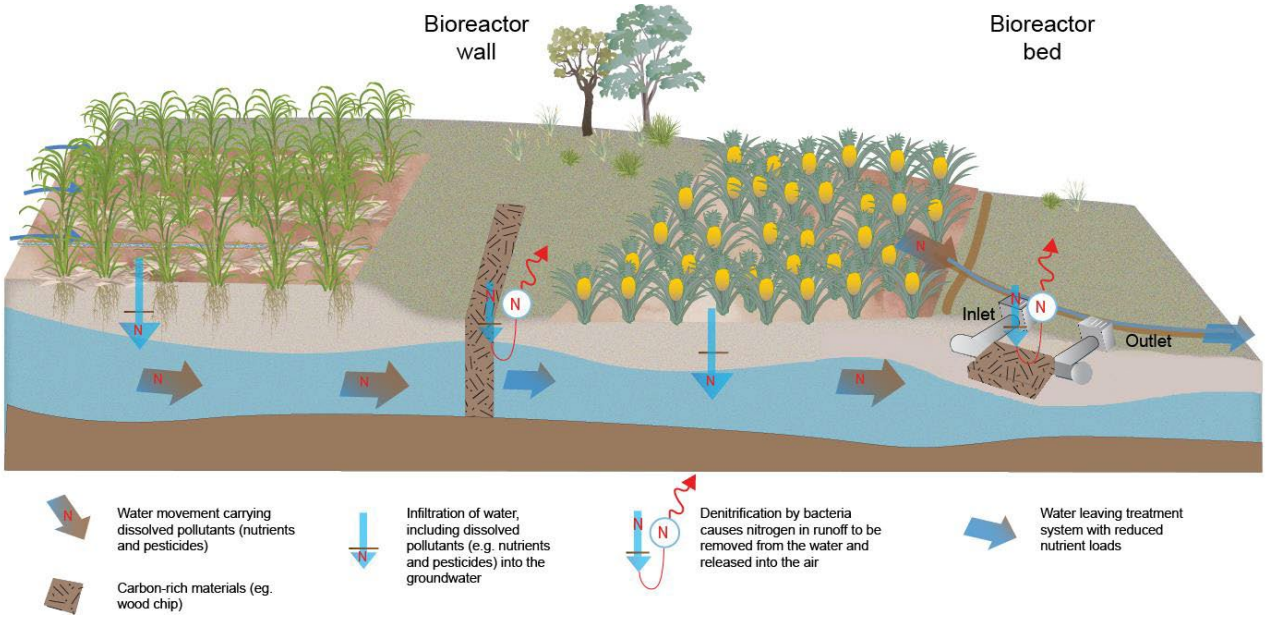
A bioreactor needs a source of carbon (in this case softwood woodchips), nitrogen in the water and a fairly anaerobic environment. Micro-organisms on the woodchip remove nitrogen from the water and release it to the atmosphere as nitrogen gas and nitrous oxide.

This bioreactor is situated on the edge of the cane paddock so that it captures the first flush of water off the field. The water first enters a silt trap then filters through a gabion basket (simple structure made of wire netting that contains rocks to filter the water) and then into a 15 cubic metre trench filled with woodchip. The water flows out the other side (by gravity) into a small water collection reservoir (which also acts as a silt trap from other runoff) where it can be recycled as irrigation water. At intervals along the woodchip filled trench vertical pipes ('piezometers') are installed so that water samples can be extracted for analysis.

This particular bioreactor has, on average, removed ¾ of the nitrate nitrogen from the water and has also showed potential to remove specific pesticides. Further research is needed to determine the removal processes for different types of pesticides.

The expected life of the bioreactor is about 10 years. There is some concern that the woodchip could be targeted by termites but this hasn't happened yet. Also, a wetting and drying cycle could result in the woodchip breaking down quicker.

Concerns over the nitrogen being removed being released as nitrous oxide (N_2O), known to be a powerful greenhouse gas, have not materialised, tests have revealed the same levels around the bioreactor as normal background levels in creeks.



More information and further information is available here:

https://wetlandinfo.des.qld.gov.au/wetlands/management/treatment-systems/for-agriculture/treatment-sys-nav-page/

https://www.publications.qld.gov.au/dataset/treatment-system-technologies-to-improve-water-quality

Green cane harvesting

Dennis does not burn cane paddocks prior to harvest. He says that green cane harvesting results in great soil retention, minimises erosion and reduces run-off.

'Mixed species'

This term relates to the fallow crop. As the name suggests a mixture of species is established, often consisting of five different species which include:

- Grass
- Up to 3 species of legume
- Brassica
- Sunhemp

The seeds are mixed in a cement mixer prior to being planted and generally the this fallow crop is grown for two months (November and December) before being ploughed or disked in.

Asked about the cost: benefit, Dennis said that the cost of the seed and establishment is minimal, about $120/ha, but the benefit is a 25% yield increase in the plant cane following a 'mixed species' fallow crop.

A mixed species fallow crop helps break the pest and disease cycle for sugarcane, reduces soil erosion mid-summer during the wet season and contributes positively to soil health. It does not appear to make a difference to soil organic matter levels because the carbon tends to be 'burnt' off at temperatures greater than 25° C (which occur most of the time in this tropical climate).

Example of a 'mixed species' fallow crop (normally denser than this) that is grown for two months between cane cycles in mid-summer

Dennis and the pineapple growers have the shared issue of feral pigs in their crops.

Dennis encouraged growers to 'think outside the box'.

AARON & MARK LINTON – PEANUT GROWERS AND CONTRACTORS, 286 HURNEY RD, OSBORNE near HOME HILL

Peanuts are a new crop for the Burdekin. It was compared with soybeans as a fallow crop, peanuts yielded 5 t/ha whilst soybeans yielded 4 t/ha. Last year the price received for peanuts was $1,200/t. Crop maturity is governed by heat units, taking between 18 to 22 weeks to reach maturity here.

Aaron has pioneered peanut production in this region and is now in his third year with them. There are now about 200 ha of peanuts in the region and Aaron and his father contract thresh for the other growers. Although peanuts will grow in most soil types, you need to plant in lighter soils for the practicalities of mechanical harvesting.

One of the drawbacks is that peanuts are hard to kill as a volunteer crop in the sugarcane crop that follows. Even 2,4-D doesn't affect them much. Some of the nuts remain dormant for a time too, so they keep coming up.

Peanut crop prior to and during digging. The digger has a couple of sharp disks either side of the bed to sever roots and vines growing into the interow, two horizontal cutter bars arranged in a shallow 'V' that travel under the peanut plants and lift them, and a moving mesh train that lifts the plants allowing some of the soil to fall off. On the downward train are two plates that up-end the plants so the nuts can dry quicker.

The peanut digger lifts the plants and up-ends them to assist with drying.

The windrows of dug peanut plants are ‘‘fluffed up” after a day or two to assist with the drying out process

The peanut thresher operated by Aaron Linton. This machine harvests the peanut plants from windrows in the field after they have been dug and partially dried out.

Aaron Linton showing the arrangement on the thresher that lifts the pineapple plants from their windrows once they are sufficiently dry. After lifting, the thresher teases the plants apart, separates the nuts from the rest of the plant and winnows out the leaves and stems.

JAMES & TIFFANY WARE, GRAIN & PULSE GROWERS, STEVENS RD, KIRKNIE, UPPER BURDEKIN

James and Tiffany were the first settlers on this farm (early 1990s) and grew sugarcane for 31 years but got sick of the politics associated with this crop and they were also getting soil compaction problems.

Three years ago, they switched to grains, in particular soybean and mung bean and have recently planted dual-crop industrial hemp for cold pressed oil and fibre. Soybean after sorghum is a good rotation but the high price of urea makes growing sorghum less economical.

The farm has 211 ha of cropping area. Most of the new crops have a 4-month cycle. About 1/3 of the farm is triple cropped and the rest is double cropped. Availability of labour is a major issue.

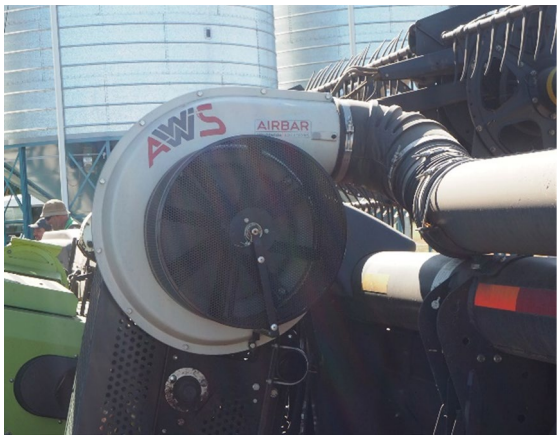
Tiffany and James Ware and a uniform crop of flood irrigated mung beans.

The Wares practice minimum till which has led to soil health benefits and higher soil organic matter levels. Their controlled-traffic wheel tracks are 3m apart and they plant a 6m swathe. Turnaround time between crops has become shorter because the soil is not as compacted as it used to be so requires less working up. They mentioned that crows foot grass has developed resistance to some of the herbicides.

One of the biggest risks is bringing seed onto the farm from other locations as it can bring with it diseases and weed seeds. They prefer to plant their own seed. They have been pushing their luck growing three crops of soybeans in a row and would like to grow a break crop, this is why industrial hemp is being tried.

Black sesame is being teted in the region, though it is reputedly difficult to harvest.

Their harvester is fitted with an 'aerial' to reduce loss of grain at the time of harvest when the seed pod shatters on contact with the header bar. It saves an average of 0.3 t grain per hectare.



The 'air assist' fitted to the header. Air from the fan (left) is delivered by the multiple silvery pipes (right) which blow grain from shattering seed pods, as they are harvested, on to the header conveyor so it doesn't fall to the ground.

AGENDA DAY 2

Friday 1st April, Pace Farming, Rollingstone

9:00am – Field walk

- Overview of farm operation & identification of main challenges on this farm for consideration by other growers – Stephen and Rian Pace
- Demonstration trial updates - Tim Wolens
- New herbicides (Balance® & Sencor®) – when they can and can't be used - Tim Wolens

Australian Pineapples update – Courtney Thies

BBQ LUNCH – kindly sponsored by Tom Masters of NESA fertilisers

Integrated Crop Protection Project – Bridie Carr and Tim Wolens

1. Update on project
2. Demonstration trial flyers
3. Grower feedback on demonstration trials

Hort360 Reef Certification & Farm resilience – Phillip Laycock (Growcom)

APUNGA (farm software recording system) – Richard Ward and Rian Pace

Russeting ('chocolate') and plant nutrition – Simon Newett on behalf of Garth Sanewski

FINISH

FARM WALK

First stop on the farm walk was to inspect a weed problem and the Paces efforts to manage them.

Peter Malone listed the main weeds on this farm as pigweed, blue top and ipomea.

In the field visited there had been a mix up of planting material so that tops and slips had been planted in the same field, however this demonstrated the different susceptibility of large and small plants to the weedicide application.

The small plants in the foreground were knocked around by the weedicide application whereas the larger plants in the background (planted at the same time with larger planting material) were relatively unaffected. The smaller plants are unlikely to yield a decent sized fruit but will be kept for their ratoon.

Tim said that growers in southern areas were moving towards separate weedicide applications rather than combining a number of herbicides in the same tank mix. In spite of the extra cost of separating some of the herbicides, better knockdown results and less phytotoxicity is being achieved. Good results are being seen using specific wetters with specific herbicides e.g. Bromacil and WetCit.

Bromacil and WetCit are said to give good results on nutgrass and other sedges.

Tony said that he was including some weedicides with his fertiliser sprays.

A field where some follow up hand spraying has been necessary to control the blue top.

In situations where a pre-emergent weedicide programme has failed it can be due to conditions being too dry - where the weedicide layer can be blown away in the dust, or too wet - where the weedicide layer is washed away in the soil erosion. For this reason, a knockdown program becomes more important.

This end of the MD2 patch is prone to flooding which the MD2 doesn't like. A patch of Roughs nearby survived the inundation much better

The plants that survived the inundation could have more tolerance than the others. In SEQ a plant that survived in a field that mostly died from root rot has been saved and propagated. It has a much greater tolerance of the disease.

These beds were injected with Telone when bed formed

Tim mentioned the fumigation trials he has been conducting. Telone is good against nematodes, chloropicrin is expensive but effective against Phytophthora root rot, Metham is OK against Phytophthora root rot. The take home message is to customise your fumigant choice to suit the situation.

The jury is still out as to how effective fumigation with bed injection is compared to broadacre application. Ability to seal the bed is a major consideration in this comparison.


Inspecting a field and root growth where a trial is being conducted using NESA's liquid fertilisers

Pace Farming is running a 7 ha trial using NESA's liquid fertilisers on a patch of 73-50s. The product is more expensive, but it is much easier to handle. Peter Malone said that they add more magnesium to the blend, and also apply extra calcium as a separate application. So far, the leaf test has been good except for a slight deficiency in magnesium and boron.

Stephen Scurr said that at Piñata they have been using NESA products for a while, getting a custom blend delivered. Stephen said that it is safer to use because it simply involves turning on a tap instead of a staff member having to climb on top of the spray tank with bags of fertiliser. He said they were actually applying less nitrogen, so they must be getting a great efficiency of use from what they do apply, plus it requires less labour.

Tim gave a pineapple 'nutrition 101' of nutritional symptoms, detailed descriptions can be found in the Pineapple Problem Solver Field Guide.

Note that too much phosphorus (including excessive use of phosphorus acid) ties up calcium – more on this later in the presentation about the fruit russeting symptom which is referred to as 'chocolate'.

A question was asked about the use of **abamectin** against nematodes in pineapple. There are only permits for its use against mites and Queensland fruit fly.

Pace Farming's breeding program has come up with a promising new variety which is being multiplied for further trials. Characteristics that are selected for include - limited natural flowering, lack of spines, bigger fruit and a balanced sugar/acid ratio.

We visited the site of some **Aus-Jubilee**. Its small size is still an issue and Paces are only planting about 20,000 per year. They are trying to get a bigger fruit size by allowing plants to get bigger before gassing.

Tony Accorsini said he has been trialling some **Aus-Festival** but is getting some cracking of the eyes and they don't look good. It may be a result of boron deficiency (see later about boron rates in gassing mixtures). Their size and taste are good though. MD2's growing alongside were OK.

Aus-Carnival fruit has a long stalk and as a result tend to bend over and get sunburnt. Also, they have inherited some bad traits from one of their parents, 53-116 'Hawaiian Gold' which is a very fibrous fruit.

Paces are planting about 70 to 80,000 **Roughs** per year, they need the right conditions to get good fruit size. They can suffer from penicillium rot but the use of Scholar (fludioxonil) helps. If the Roughs are growing too vigorously at flowering, then the fruit can develop cracks and develop an uneven shape, however earlier applications of calcium and silicon can help. They find Roughs to be susceptible to blackheart but not too bad for translucency.

A patch of Smooth Cayenne near Stephen's house which Tim said were the best he has seen in the industry. They plan to force them in two weeks' time.

Boron rate in gassing mixture

There was some debate about the rates of borax to be included in the gassing spray. The Best Practice Manual lists the rate as **5 kg borax per 1,000 L** of spray mixture (plus 50 kg of urea, and of course the label rate of ethephon). At the recommended spray volume of between 2,500 and 3,000 L, this works out to be between **12.5 and 15 kg borax per hectare**. Tim said that the common used rate is 12 - 18 kg per hectare. Paces and Accorsinis have been using only 4 kg per hectare. The boron has a dual role of raising the pH of the mixture to 9 (which is optimum for ethylene release) and providing the trace element boron which is critical for flower formation and fruit development. Boron and calcium are needed wherever cell division is taking place.

Peter eases the nutrition programme back in the lead up to gassing in order to slow the rate of growth and make the plant more likely to respond to the ethrel sprays.

MEETING

AUSTRALIAN PINEAPPLES UPDATE – COURTNEY THIES

Courtney has taken over from Stephen Pace as Australian Pineapple representative for North Queensland whom she thanked for many years of hard work.

A Growcom & DAF industry data project is being conducted to get more use out of the production data that is currently collected on behalf of industry. Safeguards around the security and privacy of individual data will continue to be maintained.

Improving the relationship between HIA and the pineapple industry. HIA has proposed that it outsource some of its responsibilities with the pineapple industry to its peak industry body, Growcom, who knows the industry better.

Main points from a presentation by James Muir (EE Muir & Sons) explaining why the cost of input materials has gone up so much.

Export of pineapples to New Zealand is being looked into. More information was requested on how mealy bug was being managed within the crop.

Diuron – growers no longer need to renew their accreditation to use it.

Automation

Product sales at times not meeting the costs of production.

The PEST group has been renamed the Pineapple Environmental Team (PET) and is now chaired by the cahirman of Australian Pineapples, Sam Pike.

Australian Pineapples is investigating the organisation becoming a not-for-profit organisation which may allow it to be able to attract more funding.

Proposal to hold a meeting during the annual pineapple field day to look at improving communications between growers in different regions in relation to reducing peaks and troughs in supply onto the market.

Courtney Theis the new NQ Australian Pineapple representative giving an update on the most recent AP meeting

INTEGRATED CROP PROTECTION (ICP) PROJECT UPDATE (PI17001) – PROJECT ENDS APRIL 2023 – TIM WOLENS

Results of demonstration trials

'Briefs' are being prepared for each of the trials that provide the background and detail of each. These will be made available once completed.

Two fact sheets have been produced thus far from the outcomes of two of the demonstration trials (hard copies available at the workshop) and are included in the appendices of these minutes. More will be prepared and made available.

- Inter-row spraying
- Improving sprayer efficiency

These first two focus on precision spraying (as opposed to broadacre spraying every time), this makes sense given the way that input costs have skyrocketed. The modifications to standard sprayers are fairly simple and can be done by most growers in their own sheds.

SENCOR® AND BALANCE® WEEDICIDES

Please refer to Appendix III for greater detail.

Two new weedicides have been registered but caution is needed. We need to learn how to use them (Tim has trials underway) because they can be phytotoxic to pineapples. The labels need to be read very carefully but can be

contradictory. They can't be applied to actively growing pineapples. They require moisture to work so if applied when it is dry, they will sit in the soil until it rains by which time the pineapples may be growing and phytotoxicity could occur.

It also helps to have the results of a recent soil test because soil cation exchange capacity (CEC), soil carbon and pH all have an effect on how these weedicides should be used in your particular environment.

Sencor®

This one is easier to use and can be applied to both plant and ratoon crops. It is quite effective on blue top.

Balance®

Only one application can be made, and it must only be applied to the plant crop. It has not been tested in soil pH's less than 6.

DIURON UPDATE

The diuron scheme has done its job and everyone appears to be using diuron as per the rules so Growcom is suggesting that there is no longer a need for everyone to have a certificate/permit to use it so there will be no need for growers to attend training to re-new their certificates this year (conducted at the field day in 2021). The current permit expires in November 2022.

TRIALS WITH AGRI-SILICA

Agri-Power sells a type of silica fertiliser which comes in different grades – granules, powder and liquid form. It is mined near Charters Towers and is a type of diatomaceous earth.
Tim is trialling three rates of the product in pineapples on John Steemson's farm near Bundaberg, the trial was established just before the annual field day last year.
Agri-Power claims that Agri-silica contains a plant available silicon which makes crops more tolerant of drought as well as pest and disease attack by strengthening cell walls. Claims are also made that the 'sharps' component of the product deters pests such as mites and makes the crop less attractive to pests.
Early results from the trial at John Steemson's farm look promising on its effect on nematodes:

Agri-silica rate	**Root knot nematode count (per 200mL of soil)**
Nil (control)	232
Low	23
Medium	40
High	16

This product may also have a more residual effect on nematodes whilst fumigants are short term knockdown before planting. Vic Millward (0438 954 500) represents Agri-Power.

ANNUAL PINEAPPLE INDUSTRY FIELD DAY – Thu 21 and Fri 22 July

This year the field day will be held in SEQ.

Day 1:

AM

Visit to Sam Pike's farm to look at the development of a farm-wide bioreactor.

Visit to Farouk Bazuki's farm 'Pine Co' to look at a multi-purpose in-field chassis that could have applications such as picking early fruit, pulling weeds, etc. Also, a machine to collect tops from the field.

Lyro will hopefully have their robotic planting material grader on display too.

PM

Trade display in Bethonga's shed.

Gala dinner that evening.

Day 2:

Pinata farm, Harrison Rd to look at new products and compost.

Look at two types of geo-polymer and the benefits for combining with weedicides

Precision boom sprayer

Polsoni's shed to learn more about the Favco varieties.

HORT360 REEF CERTIFICATION & FARM RESILIENCE – PHILLIP LAYCOCK (GROWCOM)

Hort360 is not a regulatory tool, it is a whole of farm business management tool and allows you to benchmark where you are with your farm management practices. It identifies needs and advises you where to go for necessary information. It drives improvement across industry.

The Farm Resilience program is designed as a pro-active rather than re-active programme. It is also a pre-requisite for getting Queensland Rural and Industry Development Authority (QRIDA) funding.
https://www.awe.gov.au/agriculture-land/farm-food-drought/drought/future-drought-fund/farm-business-resilience-program

QRIDA will subsidise 50% of the cost of farm business advice up to the value of $2,500.

Grants of up to $50,000 are available for drought and up to $1.3m for sustainability loans.

Reef Certification is already needed in the sugarcane and banana industries. The government is looking for evidence that growers are using good practice. Some of your FreshCare efforts contribute towards Reef Certification. Starting the Reef Certification module doesn't commit you to having to have an external audit. The module takes 20 to 30 minutes to work through. If you opt to seek Reef Certification, it is on a three-year audit cycle but includes doing an annual self-assessment. There are plans to link the Reef Certification with InfoPest.

One-on-one assistance is available from Growcom staff.

Information is also available on FairFarms from Growcom.

For further information or assistance with Reef Certification, Hort360 in general etc contact your local Growcom officer, **Phil Laycock**, Hort360 GBR officer, **0439 252 828** phillaycock@growcom.com.au

Website: www.hort360.com.au

APUNGA (FARM SOFTWARE RECORDING SYSTEM) – RICHARD WARD AND RIAN PACE

Richard is based in Brisbane and has assisted Growcom with the programming for InfoPest, Fair Farms etc.

The Apunga farm recording software is cloud-based but it can also be used off-line. In its simplest form it is a spray diary. With Apunga, the data is owned by the grower not the software company and the data is saved within Australia.

In the UK growers have to have digital on-line records for buyers to be able to access.

Rian Pace used to use 'Muddy Boots' but has shifted to Apunga. He has a $100 tablet computer which stays in the tractor cab but is linked to the main computer so entries of field applications entered on the tablet are automatically uploaded to the main computer.

Features include:

- For each block there is a timeline which by sliding the pointer with a mouse you can look back through the history of applications and farm practices.
- Jobs are planned ahead and will come up as reminders.
- For each job it calculates how much chemical or fertiliser is needed and will raise a query if a different amount is used in the job itself.
- It has a 're-growth' function (originally designed for salad crops that are cut then re-grow) which can be used for ratoons in pineapples.
- It can integrate with automatic weather stations.
- Report generating – liked by auditors

The grower does not buy the software, rather they pay a monthly use fee, this can range from $60/month (currently used by Pace Farming) up to $2,500/month for a large and complex farm. The $60 /month fee allows for up to five users. There is no set up fee and full training is provided.

Richard Ward, Chief operating officer, Apunga software **0414 731 606** richard@apunga.com website www.apunga.com

"CHOCOLATE" - A FORM OF FRUIT RUSSETING AND ITS CONNECTION TO PLANT NUTRITION – Simon Newett on behalf of Garth Sanewski, DAF

Please refer to Garth's very descriptive presentation. A copy has been uploaded to the website and can be accessed here. *Remember to get in touch with Natalie Brady if you don't have access or need help with the website!*

Simon explained that "chocolate" is the result of nutritional problems and is different from russeting caused by sunburn. Also, investigations by Garth show that it is not caused by mites.

Eyes affected by 'chocolate'

Symptoms

- Chocolate coloured eyes on any part of the fruit (unlike sunburn which will be found only on the upper/exposed side). Can include corking and callousing. Relatively shallow.
- Absence of trichomes, which give the plant surfaces hydrophobic and light reflective properties, resulting the fruit and leaves having a polished appearance.
- Fruit core may be cracked and may be brown. Fruit is usually more fibrous.
- Abnormalities in crown growth with shiny/oily appearance (similar to calcium and copper deficiency). Crown may die (like calcium and zinc deficiency).
- Fruit stalk may be bent and short (similar to zinc deficiency), and fruit may be deformed and die.
- Leaves may have a polished appearance (lack of trichomes), be distorted and malformed, and growing point may die (typical calcium deficiency symptoms).

Leaf death and distortions seen on Sam's farm. May be associated with 'chocolate'

Causes

- "Chocolate" is likely caused by a **deficiency of cations**. (Cations are positively charged elements that include calcium Ca^{2+}, magnesium Mg^{2+}, potassium K^{+} and some trace elements such as manganese Mn^{2+}, zinc Zn^{2+} and copper Cu^{2+}).
- Soil analysis in affected areas show that the soil is low in calcium and manganese and has a low pH. Sometimes other cations (potassium and magnesium), zinc and boron may also be low. **Low soil pH** and soils with a **low cation exchange capacity** (CEC) i.e. gutless soils such as sands, are prone to rapid leaching of cations – the soil doesn't have the capacity to retain nutrients.
- Leaf analysis reveals that affected plants are particularly **low in calcium and manganese**, and are also low in magnesium, zinc, copper and boron.
- In addition, **excessive or badly timed phosphorous acid applications** could be causing a temporary tie up of cations, particularly calcium. Cations and phosphorus tie each other up and if phosphorous acid is applied at a critical time in the growth cycle, such as flower and fruit development, then calcium deficiency symptoms can result.
- Calcium is critical for the formation of strong cell walls – many of the symptoms associated with "chocolate" are linked to **weak cell walls** caused by **calcium deficiency** - small and mis-shapen fruit, growing point abnormalities, malformed crowns etc.
- **Manganese** is an overlooked element and is required in greater quantities in pineapple than other trace elements. Its role includes stress tolerance to high temperatures, sun exposure and drought. Manganese also has a role in resisting root disease.
- **Copper** deficiency symptoms include a lack of trichomes and dieback of growing tips**.**

Suggested treatment/prevention

- Raise the pH to 5.2 – 5.5.
- Increase soil organic matter (a long-term undertaking) to increase soil CEC.
- Conduct a comprehensive soil analysis (including trace elements) prior to planting, interpret results and apply ameliorants as required in balanced amounts. For example, applying too much potassium can displace calcium. Note that boron and calcium work hand-in-hand so ensure that neither is deficient.
- Avoid excessive and poorly timed phosphorous acid applications.
- Avoid excessive use of phosphorus fertilisers such as MAP and DAP.

PINEAPPLE INDUSTRY WEBSITE
Also see Appendix IV.

The Australian Pineapple industry website continues to be updated regularly providing growers with a central point for information.

How do I register? Visit: www.australianpineapples.com.au/members

1. Enter your details on the right under 'Register'.
2. Please note: Because the industry section of the website is attached to the consumer website, all registrants need to be approved before you are granted access. This could take a couple of days to occur.

Please note, this site is intended for use by Australian pineapple growers only and therefore agricultural supply chain members will not be granted access.

What will I find on the website?

- Information about Tim's research & development trials.
- All videos including the ones that will be developed under the project.
- Study Group meeting minutes.
- An electronic copy of the Pineapple Best Practice Manual.
- Past editions of the Pineapple Press newsletter.
- A list of upcoming industry events.

Need help? If you are having issues accessing or using the website, please contact:

Natalie Brady -Growcom
07 3620 3844
nbrady@growcom.com.au
(please note working days are Monday - Thursday)

Bridie Carr - DAF
07 5381 1327
0436 675 740
bridie.carr@daf.qld.gov.au

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Simon Newett, Bridie Carr and Tim Wolens

These workshops are part of the project "Improved viability and sustainability of the Australian pineapple industry" (PI17001) which is a strategic levy investment under the Hort Innovation Pineapple Fund. The project is delivered by the Department of Agriculture and Fisheries, Agri Supply Global and Growcom and funded by Hort Innovation using the pineapple industry research and development levy, with co-investment from the Queensland Department of Agriculture and Fisheries, and contributions from the Australian Government.

The upper reaches of Pace Farming

APPENDIX I

INTER-ROW SPRAYING

RETROFITTED SPRAYERS TARGETING THE INTER-ROW ARE GIVING GROWERS MORE WEED CONTROL OPTIONS

- Simple adaptions have been made by multiple growers to pre-existing machinery enabling them to target their herbicide applications into the inter-row.
- These growers have access to a wider selection of herbicide options because they can avoid direct spray contact with the plant crop.
- The registered chemical for controlling bluetop/billygoat weed is Glufosinate-ammonium 200g/L (like Basta or Beast 200) which causes damage to the crop.
- Growers are successfully using this product by localising the spray to the inter-row and avoiding plant contact - one grower has seen up to a 75% reduction in their bluetop/billygoat weed population.
- The estimated cost of setting up an inter-row sprayer is $500-$1000.
- Potential savings can be made by growers with 50% less inputs being required compared to broadacre spraying.

FOR MORE INFORMATION OR FREE ADVICE ON HOW TO SET UP YOUR SPRAYER CONTACT:

BRIDIE CARR - 0436 675 740 OR TIM WOLENS - 0409 848 076

APPENDIX II

IMPROVING SPRAYER EFFICIENCY

BOOMSPRAYERS FITTED WITH DROPPERS ENABLE GROWERS TO BAND SPRAY AND INCREASE THE AREA COVERED BY ONE SPRAY TANK

- A standard boomsprayer can be adapted to have multi-outlet nozzles fitted at each spray point which includes a 30cm extended dropper
- Each dropper can be positioned above the plant row or inter-row and the height of the arm adjusted to suit plant size
- Wasted spray mix on the inter-row and bare ground is minimised thus reducing inputs (product and labour) and potential run off
- Conventional boom = 1.5 ha per tank lasting 20 mins before refill
  Boom using droppers = 4.0 ha per tank lasting 55 mins before refill
  Product and labour costs more than halved
- The estimated cost to retrofit a standard industry boomsprayer is ~$95 per manifold
- Return on investment from:
  - Reduction of labour cost with less down time refilling spray tank
  - Reduction in input costs with one spray tank covering a larger area

FOR MORE INFORMATION OR FREE ADVICE ON HOW TO SET UP YOUR SPRAYER CONTACT:

BRIDIE CARR - 0436 675 740 OR TIM WOLENS - 0409 848 076

APPENDIX III

KEY POINTS: BALANCE® 750 WG AND SENCOR® 480 SC HERBICIDE

Tim Wolens, Agri Supply Global

BALANCE® 750 WG HERBICIDE

***Warning**: some of the instructions on the labels are contradictory, e.g. initially advising not to use any wetting agents, crop oils or other adjuvants, then later advising their use. For this reason, growers are urged to await trial results and further information, or exercise extreme caution and test them out on small areas initially.*

Restraints

- DO NOT apply with wetting agents, crop oils or other adjuvants.
- DO NOT apply to poorly drained soils e.g. soils prone to waterlogging, sodic soils or soils affected by physical compaction.
- DO NOT apply to crops with poor root development or to crops under stress from waterlogging, drought, nutrient deficiency or disease.
- **DO NOT apply at any rate to soils of cation exchange capacity (CEC) less than 3 meq/100g or with clay content less than 10%, or with organic carbon content less than 0.8%.** These should be obtained from soil analysis prior to using Balance®. *Note: this may rule it out on many pineapple blocks.*
- DO NOT apply at rates of 125g/ha or higher to soils with organic carbon content of less than 1.0%, unless the cation exchange capacity (CEC) is above 9.5meq/100g. These should be obtained from soil analysis prior to using Balance®.
- DO NOT apply at rates of 125g/ha or higher to soils of cation exchange capacity (CEC) less than 4.5meq/100g.
- DO NOT apply if there are hazardous surface temperature inversion conditions present at the application site during the time of application. Surface temperature inversion conditions exist most evenings one to two hours before sunset and persist until one to two hours after sunrise.

Withholding Periods – Harvest: NOT REQUIRED WHEN USED AS DIRECTED

Directions for use

Apply as sprays to the soil surface. Balance® 750 WG can be applied in hot and dry soils, without risk of rapid breakdown by sunlight. For effective weed control, incorporation by rainfall or irrigation to the weed root zone is required, but immediate soil incorporation is not critical due to the ultraviolet stability of Balance®.

Crop Situation - Pineapples plant crop only- 100g/ha.

Weeds

Amaranth, barnyard grass, bluetop, blackberry nightshade, crowsfoot grass, feathertop Rhodes grass, fleabane, green summer grass, guinea grass, needle burr, pigweed, sowthistle, summer grass, thick head, turnip weed.

Critical Comments

Balance® can be used alone or in mixtures with other residual herbicides e.g. Sencor® 480 SC Selective herbicide at 1.6L/ha. Control of difficult weeds species can be improved with tank mixtures.

Plant Crop: Apply as broadcast spray only prior to weed emergence (0 - 15 days) after planting and before planting materials begins to grow roots or new leaves. DO NOT apply more than one application in the plant crop.

Do not disturb the soil surface after application.

If weeds are established at the time of application, add a suitable registered contact herbicide.

DO NOT use adjuvants or penetrants which may cause phytotoxicity to crops. Refer to Bayer science for further information.

General Instructions

Apply Balance® in a spray volume of 2,000 to 3,000L/ha. Lower water rates (e.g. 550L/ha) may result in increased phytotoxicity. Use a nozzle size and operating pressure that delivers a coarse or larger droplet size category.

General points from other crops

Prolonged dry periods of cold conditions may result in extended re-cropping intervals, even if rainfall exceeds the required amounts.

Heavy rainfall after an extended dry period may results in the reactivation of Balance® 750 WG. This can lead to transient bleaching or crop stunting.

Use on soils with a pH less than 7 has not been extensively tested, and may result in extended re-cropping intervals.

Balance® is adsorbed to organic matter and clay particles in the soil. **Soils with low organic carbon (OC) a cation exchange capacity (CEC) have a reduced capacity to adsorb the herbicide in the soil**, which may result in the herbicide leaching past the weed root zone into the pineapple root zone. To minimise the risk of crop root uptake, Balance® 750 WG is not recommended for use on some soils.

The use of Balance® on newly limed soil could cause sever crop damage, please see your local Bayer crop science representative for advice prior to this situation.

SENCOR® 480 SC HERBICIDE

***Warning**: some of the instructions on the labels are contradictory, e.g. initially advising not to use any wetting agents, crop oils or other adjuvants, then later advising their use. For this reason, growers are urged to await trial results and further information, or exercise extreme caution and test them out on small areas initially.*

Restraints

- DO NOT apply until soil is well wetted by the first good soil setting rain after sowing.
- DO NOT spray plants under stress from drought, waterlogging, frost or disease.
- DO NOT apply if there are hazardous temperature inversion conditions present at the application site during the time of application. Surface temperature inversion conditions exist most evenings one to two hours before sunset and persist until one to two hours after sunrise.
- DO NOT apply by a boom sprayer unless the following requirements are met:
    - Spray droplets not smaller than a coarse spray droplet size category in pineapple
    - Minimum distance between the application site and downwind sensitive areas (see mandatory buffer zones section of the following table title buffer zones for boom sprayers) are observed

Application Rate	Boom height above the target canopy	Mandatory downwind buffer zones		
		Natural aquatic areas	Bystander areas	Vegetation areas
Greater than 750mL/ha	0.5m or lower	0m	0m	0m
	1.0m or lower	0m	20m	0m

Crop Situation: Pineapples 1.6L/ha

Critical Comments:

- Plant crop: apply as a single broadcast spray prior to weed emergence immediately after planting (within 0 – 15 days) and before planting material beings to grow roots or new leaves.
- Ratoon crop: Apply as a single directed or broadcast spray within 30 days of the plant crop harvest maximising contact of the herbicide with the soil. Do not apply if the ratoon crop contains a high percentage of suckers or slips / buttons.
- DO NOT apply more than one application in the plant or ratoon crop.
- Soil should preferably be slightly moist at application. Incorporation by rain or irrigation within 7 days after application is necessary for best results.
- Sencor® can be used alone or in mixtures with other residual herbicides e.g. Balance® 750 WG herbicide in the plant crop. Control of difficult weeds species can be improved with tank mixtures.

General

Best results are obtained if treatment is made to moist soil and moisture is supplied by rainfall or sprinkler irrigation (6-12mm) within 2 weeks after application. If heavy rains occur soon after application, injury to the crop may result.

Pre-emergence

Soil should preferably be moist to the surface and not cloddy or have residues of a previous crop on the surface. It is better to delay pre-emergence spraying of loose or fluffy soils until there is a good soil setting rain. Rain or irrigation soon after spraying is required to activate Sencor®.

Post-emergence

Post-emergence spraying will control young actively growing emerged weeds through the leaf uptake. Subsequent pre-emergence control of later germinating weeds requires rain or irrigation after spraying. Crops may show slight chlorosis or necrosis after spraying. Two sunny days before spraying enhances crop tolerance. Heavy rain (80-100mm) after spraying on deep sandy or friable well-structured sol may leach Sencor® beyond the root zone this reducing residual effect.

Ground Spraying (pineapples only)

Apply Sencor® in a spray volume of 2,000 to 3,000L/ha. Use a nozzle size and operating pressure that delivers a coarse or larger droplet size category.

APPENDIX IV

AUSTRALIAN PINEAPPLES

GROWER WEBSITE

A NEW WEBSITE HAS BEEN DEVELOPED FOR GROWERS

VISIT AND REGISTER AT:

WWW.AUSTRALIANPINEAPPLES.COM.AU/MEMBERS

- Demonstration trial information, results and grower feedback (regularly updated)
- Study group minutes and 'Pineapple Press' newsletters
- Industry 'Newsroom' for event notices and classifieds
- Online copy of the 'Pineapple Best Practice Manual'
- Industry videos
  - Handling pineapples in the field
  - Leaf sampling for flower induction or nutrient analysis

NEED HELP WITH LOGGING ON?
Contact Natalie Brady: 07 3620 3863

growcom | AUSTRALIAN PINEAPPLES | AGRI SUPPLY GLOBAL | Hort Innovation | PINEAPPLE FUND | Queensland Government