HCPSL
Herbert Cane Productivity Services Ltd.

THE CANE STALK

June 2018

A word from the Manager

The past 6 months have been extremely busy for all staff with preparations for the commencement of the planting and harvesting season, extension activities (the Herbert Walk and Talk, Grower Update), seed inspections, approved seed sales, laser levelling surveys, basestation maintenance and soil mapping of fallow fields. The dry May period meant that field activities commenced earlier than most previous years.

The industry consultation meetings associated with the HCPSL Strategic Planning process were fruitful and informative. Three grower meetings were conducted, 1 staff meeting was conducted, 1 meeting with representatives from Wilmar and engagement with 5 strategic alliance groups to seek their views and opinions concerning HCPSL as a company and to develop the Strategic Plan for the Herbert region. The draft Strategic Plan documents will be submitted to the HCPSL Board at its June meeting.

It is expected that it will be release mid year 2018!

The new ***HCSPL website*** is launched. As time progresses additional information will be uploaded onto the site.

Go to www.hcpsl.com to log onto the HCPSL website.

The Herbert Industry Awards were presented at the HCPSL Annual Walk and Talk Day 2018 which was held at Macknade this year. Below were some of the awardees:

Morselli Family Farming—Grower of the Year

Lyle Glenwright—Young Grower of the Year

Roger Celotto—Life Time Achievement

Cordner Family—Innovation Award

Courses on Offer to all Growers:

- **Six Easy Steps**
- **Integrated Weed Management**
- **Safechem (Chemcert)**

INSIDE THIS ISSUE:

Variety recommendations

Sam Sellick continues to provide specific variety management plans to growers through the Herbert. QCane Select and HCPSL data is used to develop these plans with growers. It is anticipated that 20-30% of area planted will be covered off by the variety planning services or specific grower requests. If you would like more information concerning new varieities or management of varieties please contact Sam Sellick (HCPSL Field Agronomist) on 0417622 129.

Characteristics	SRA5Ø	SRA3Ø	Q253Ø	Q250Ø
PARENTAGE	H72-8597 x QN89-109	QN86-2214 x Q200Ø	QN80-3425 x Q209Ø	QN79-183 x QN89-1043
SEEDLING CODE	QN04-668	QN02-777	QA01-5153	QN00-1511
SMUT INFORMATION	INTERMEDIATE	INTERMEDIATE - SUSCEPTIBLE	RESISTANT	RESISTANT
APPEARANCE	Light-green to green average-thick stalks, light purple in colour when exposed with prominent wax band. Leaves are broad, semi-erect and curve at tips. Loose trashing. Open stool habit with moderate-high tiller numbers. Arrowing is absent to sparse.	Medium size barrel, creamy-yellow to a light green in colour (darker green when exposed). Moderate wax covering with no defined wax band. Leaves are erect and curve at tips. Trash has moderate adherence; purple-reddish stripes on leaf sheath.	Thick light to dark green stalk (strong green in colour when fully exposed). Moderate wax band with medium width. Leaves curved at tip, sparse arrowing late season. Trash has moderate adherence to stalk and there is a distinct lanceolate auricle.	Thick creamy light green stalks (purple tinge when fully exposed). Erect leaves that curve at tips, sparse to moderate arrowing. Trash is loosely attached; purple-reddish stripes near the leaf scar on leave sheath.
FEATURES/COMMENTS	A vigorous variety with good ratooning potential when grown in very harsh environments. Moderate-high cane yield but very low CCS (up to -2 units below) under good growing conditions. Only recommended for extreme wet and dry environments where other varieties struggle to grow. NICHE VARIETY ONLY.	Average TCH and CCS (better mid to late season). Similar environments as Q208A but has shown better vigour in older ratoons and has a better canopy cover for easier management. Shows some promise under harsh conditions. Single tiller produced when striking but then tillers out.	Erect to medium sprawling habit with a moderate number of tillers. Has moderate tonnes in plant crop but improved in ratoons. It has been noticed in the Burdekin to survive dry conditions. Due to a low CCS it will be a niche variety suited to poor country only.	Erect type with a moderate number of tillers. Has some resistance to majority of diseases. Pachymetra is intermediate – recommend to rotate with resistant varieties in problem areas. Good germination & stool. Suited to Average to Better Soil Types
HARVESTING TIME		Mid, Late	Mid, Late	Early, Mid, Late
SUITED SOILS	Clay, Sandy, Hill Slope, Terrace Loamy	Sandy, Clay, Terrace Loamy, Hill Slope	Sandy, Clay, Hill Slope	Terrace Loamy Note: better varieties are available for these soil (s).
SEASONAL SUGAR -				
EARLY	Poor	Poor	Poor	Good
MID	Poor	Average	Average	Good
LATE	Poor	Good	Average	Good
PRODUCTIVITY -				
YIELD	Moderate - High	Moderate	Moderate - High	Moderate
CCS	Low	High	Low	High
SPEED OF GERMINATION	Average	Average	Average	Average
UNDER WET CONDITIONS	Good	Good	Good	Good
UNDER DRY CONDITIONS	Good	Average	Good	Poor
LODGING TOLERANCE	Unknown	Average	Good	Average
TRASH YIELD	Unknown	Unknown	Unknown	Unknown
REACTION TO STRESS -				
WATERLOGGING	Good	Good	Good	Average
DROUGHT	Good	Average	Good	Poor
FLOOD	Average	Good	Good	Unknown
DISEASE REACTION -				
Resistant	Brown Rust, Orange Rust, Red Rot	Brown Rust, Orange Rust	Leaf Scald, Orange Rust, Smut	Leaf Scald, Smut
Intermediate - Resistant	Leaf Scald	Red Rot		RSD, Yellow Spot
Intermediate	Smut	Leaf Scald	Pachymetra, Red Rot	Orange Rust, Red Rot
Intermediate - Susceptible	Pachymetra	Pachymetra, Smut	Brown Rust	Pachymetra
Susceptible		Root Knot Nematode, RSD	Root Knot Nematode, RSD, Yellow Spot	Root Knot Nematode
Unknown	Chlorotic Streak, Lesion Nematode, Root Knot Nematode, RSD, Yellow Spot	Chlorotic Streak, Lesion Nematode, Yellow Spot	Chlorotic Streak, Lesion Nematode	Brown Rust, Chlorotic Streak, Lesion Nematode
CANE GRUB TOLERANCE	Unknown	Unknown	Unknown	Unknown
HERBICIDE REACTION	Unknown	Sensitive to: FLAME®	Sensitive to: BALANCE® FLAME®	Sensitive to: BALANCE®
CROP MANAGEMENT PRACTICES	Has shown promise on low fertile soils based on very limited data and field observations.	Striking a single tiller first, establishment in mounds may be a problem under dry conditions.		Plant in soils that hold moisture

Characteristics	Q208Ø	Q200Ø
DISEASE REACTION -		
Resistant	Brown Rust, Chlorotic Streak, Leaf Scald, Orange Rust, Red Rot, RSD, Yellow Spot	Brown Rust, Leaf Scald, Orange Rust, Red Rot, RSD, Smut
Intermediate - Resistant	Smut	Yellow Spot
Intermediate	Pachymetra	Chlorotic Streak, Pachymetra
Susceptible	Lesion Nematode, Root Knot Nematode	Lesion Nematode, Root Knot Nematode
CANE GRUB TOLERANCE	Average	Poor
HERBICIDE REACTION		
CROP MANAGEMENT PRACTICES	Maintain recommended nitrogen rates to maximise CCS and prevent lodging.	Needs soil moisture to maximise yields, & adequate calcium, zinc and magnesium levels.

Characteristics	Q242Φ	Q240Φ	Q232Φ	Q231Φ
PARENTAGE	Q170 x Q150	QN81-289 x SP78-3137	QN80-3425 x QS72-732	QN85-1647 x QS80-7441
SEEDLING CODE	QS97-2067	QS96-434	QS94-2329	QN95-1882
SMUT INFORMATION	INTERMEDIATE	RESISTANT	RESISTANT	INTERMEDIATE - RESISTANT
APPEARANCE	Yellow-green stalks with medium-light wax covering. Broad leaves, curved at tip. Trash held loosely. Hairless. Growth cracks present. Very open stool.	Green thick to average pale-green stalks, strong maroon when exposed. Med-strong wax covering. Open stool but fairly erect. Hairless to minimal hairs. Broad leaves and there is a distinct lanceolate auricle.	Dark green leaves, medium width, erect and bent at the tip. Open stool with many stalks. Thick stalks, tight-trashing. Stalks are light green unexposed, green when highly exposed. Stalks have a distinct bud-groove. Hairless or minimal hairs.	Yellowish green stalks with moderate - heavy wax and clinging trash. Large stools with numerous thin stalks.
FEATURES/COMMENTS	Rapid germinator. Below average CCS but good yields. Can handle extreme conditions and therefore suited to poor country.	Good TCH, and average to good CCS. Heavy suckering noted in the Burdekin from mid-season. Grows extremely well on good soils.	Moderate to high yield levels and average to poor CCS mid to late in the season. Q232 flowers heavily. Emerges well. Vigorous growth, stool tips in lighter soils then can get gappy.	Potentially good early CCS. Best results to date have been recorded on fertile clays with good moisture.
HARVESTING TIME	Early	Early, Mid, Late	Mid, Late	Early, Mid, Late
SUITED SOILS	Terrace Loamy, Hill Slope, Clay, Sandy	Terrace Loamy	Clay, Hill Slope	Clay Note: better varieties are available for these soil(s).
SEASONAL SUGAR -				
EARLY	Average	Average	Poor	Good
MID	Poor	Good	Average	Average
LATE	Poor	Good	Average	Average
PRODUCTIVITY -				
YIELD	Moderate - High	Moderate	Moderate - High	Moderate
CCS	Low - Moderate	High	Low	Moderate
SPEED OF GERMINATION	Rapid	Average	Average	Average
UNDER WET CONDITIONS	Good	Average	Average	Average
UNDER DRY CONDITIONS	Good	Average	Average	Average
LODGING TOLERANCE	Poor	Average	Average	Average
TRASH YIELD	Unknown	Unknown	Unknown	Unknown
REACTION TO STRESS -				
WATERLOGGING	Good	Good	Average	Good
DROUGHT	Average	Average	Average	Poor
FLOOD	Good	Average	Unknown	Average

Characteristics	Q242Φ	Q240Φ	Q232Φ	Q231Φ
DISEASE REACTION -				
Resistant	Leaf Scald, Orange Rust, Pachymetra, Yellow Spot	Leaf Scald, Orange Rust, Red Rot, RSD, Smut	Chlorotic Streak, Leaf Scald, Orange Rust, Smut, Yellow Spot	Orange Rust, Pachymetra, Red Rot, RSD
Intermediate - Resistant	Red Rot	Chlorotic Streak	Red Rot	Leaf Scald, Smut
Intermediate	Chlorotic Streak, Smut	Pachymetra, Yellow Spot	Pachymetra, RSD	Yellow Spot
Susceptible	Lesion Nematode, Root Knot Nematode, RSD	Lesion Nematode, Root Knot Nematode	Lesion Nematode, Root Knot Nematode	Root Knot Nematode
Unknown	Brown Rust	Brown Rust	Brown Rust	Brown Rust, Chlorotic Streak, Lesion Nematode
CANE GRUB TOLERANCE	Poor	Average	Unknown	Unknown
HERBICIDE REACTION		Sensitive to: BALANCE® FLAME®	Reaction to Flame has been observed.	
CROP MANAGEMENT PRACTICES	Avoid areas prone to Chlorotic streak. Harvest early if heavily flowered.	Plant in soils that hold moisture	Avoid using heavily flowered plant sources for late planting.	Monitor nitrigen rates to maximise early CCS. Harvest early if heavy arrowing occurs.

Characteristics	Q208Φ	Q200Φ
PARENTAGE	Q135 x QN61-1232	QN63-1700 x QN66-2008
SEEDLING CODE	QA87-1413	QN89-356
SMUT INFORMATION	INTERMEDIATE - RESISTANT	RESISTANT
APPEARANCE	Green stalks turning yellow when exposed with light waxing. Younger stalks may turn deep purple on exposure to sun. Open stool with many free trashing stalks.	Thin, average sized dark red to purple stalks when exposed, green waxy stalks within the crop and erect, dark green foliage. Stools contain numerous stalks with a slightly bowed habit.
FEATURES/COMMENTS	Slow but reliable germinator. Tolerance to drought, waterlogging and poor soil conditions. Can be harvested all year round under normal conditions.	Good CCS variety with Smut resistance. Don't harvest early if conditions are cold and wet.
HARVESTING TIME	Early, Mid, Late	Early, Mid, Late
SUITED SOILS	Terrace Loamy, Sandy, Clay, Hill Slope	Terrace Loamy, Clay, Sandy
SEASONAL SUGAR -		
EARLY	Good	Good
MID	Good	Good
LATE	Good	Good
PRODUCTIVITY -		
YIELD	Moderate - High	Moderate
CCS	Moderate	High
SPEED OF GERMINATION	Slow	Average
UNDER WET CONDITIONS	Average	Good
UNDER DRY CONDITIONS	Average	Average
LODGING TOLERANCE	Average	Good
TRASH YIELD	Unknown	Unknown
REACTION TO STRESS -		
WATERLOGGING	Good	Good
DROUGHT	Good	Average
FLOOD	Average	Average

Feral Pigs

The Hinchinbrook Community Feral Pig Management Program is funded by the cane industry through HCPSL, Forestery Industry, National Parks, The Queensland government & Hinchinbrook Shire Council. David Bacchiella from Hinchinbrook Shire Council is funded to assist growers with feral pig trapping & baiting. This program has been very successful with a significant reduction in feral pig numbers and reduction in losses of cane since its inception.

Growers are encouraged not to allow doggers on their farms when baiting and trapping is underway, because pigs will become dispursed and more difficult to control. Growers are also urged to erect NO TREPASSING signs, up around the farm to detract doggers from entering the property. Doggers who trepass onto a property without a landholders permission are breaking the law and can be prosecuted.

Information on feral pig management can now be found on the HCPSL website under the Farm Management tab. If you need assistance with feral pig management on your farm please contact:

David Bacchiella (Hinchbrook Shire Council) 0458 764 660

Aerial Rat baiting

HCPSL coordinated aerial rat baiting activities during the past 2 months. Four farms were baited over 36.4 hectares. Standover blocks and blocks of Q208 were the main target situations.

Growers who wish to undertake aerial baiting are required to come into the HCPSL office with a farm map identifying the blocks to be treated and identify any safety issues for the aerial applicator (like powerlines & trees). Growers will be invoiced by HCPSL for aerial application and the cost of the bait.

WTSIP project
By Leanne Carr & Jarrod Sartor

Grant applications

The WTSIP Extension team of Leanne and Jarrod hosted information sessions for RT3 and RT4 grants, with about 30 growers attending.

The WTSIP team assisted 5 growers with RT4 applications.

The team lodged **24** RT3 round 2 grants out of a total of **52** submitted for the total Wet Topics area; so the Herbert region consisted of 46% of applications of those submitted in the Wet Tropics region. The total value of projects applied for in this round from the Herbert was $1.608M of this the portion of funding requested being $704,724. The total funding sought from the Wet Tropics applications was $1.207M of which the Herbert accounted for 58%.

Nutrient Management Plans (NMPs) for growers

- The WTSIP team now has requests for over 220 NMPs from growers. The team is struggling to meet the demand by industry at present. HCPSL and WTSIP management are currently investigating how to meet the increasing grower demand for NMPs.

- To date the team have commenced 101 NMP, updating 15 NMP's developed in 2017 and 50 plans have been completed and delivered to growers this year.

The Herbert WTSIP team have also organised and run two workshops for Herbert growers (funded through Project NEMO and WTSIP), with David Hardwick "Creating Healthy Soils". These workshops have received very positive feedback from growers who attended. In total 30 participants were involved with the workshops. Another workshop is being run on Wednesday the 13th of June. It is also proposed to run a 4-day workshop for extension staff, with 2 days in June and 2 days in July. This will follow David's Digging Deeper (Soil Psychology) Series and David agreeing to add an extension component to assist staff develop new techniques to assist in getting the message out concerning managing soils and considering influences of management practices on how the soil works.

Growers who wish to participate in up and coming "Creating Healthy Soils", workshops are urged to contact Sandra Coco (HCPSL) on 47 761808.

EEF60 project
By Shannon O'Brien

EEF60 is designed to identify whether Enhanced Efficiency Fertilisers (EFFs) can provide a significant increase in nitrogen use efficiency (NUE) and reduction in nitrogen losses, resulting in a more profitable farming business.

The project will include controlled and replicated field trials, conducted over three seasons, including 30 in the Wet Tropics (9 sites currently in the Herbert), 15 in the Burdekin, 10 in the Central and five in the Southern regions. The objective is to capture 18 years' worth of trial data.

These trials will provide information on the effect of EEFs in terms of TCH, CCS, and NUE effect on grower profitability.

Environmental losses (run-off and deep drainage) will be assessed at six of the 60 sites.

Shannon O'Brien (HCPSL Extension Agronomist- EEF60) commenced work with HCPSL. Shannon will be providing extension support for the project in the Herbert and Tully regions.

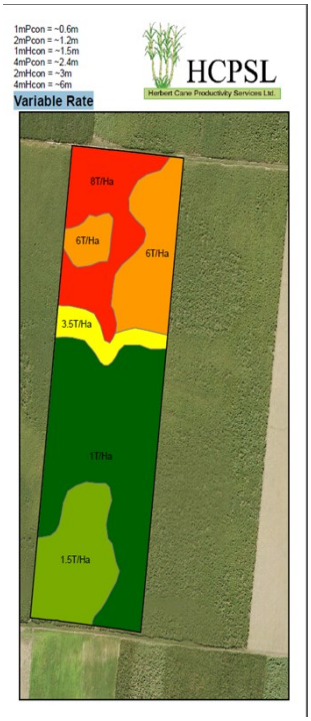
Dualem Soil Mapping and Basestations
By Mike Sefton

Two of HCPSL's GPS base stations suffered severe damage from the storms in March this year.

All damage has been repaired with insurance paying for most of the damage which was around $25,000 in total.
Herbert Vale repeater was also upgraded from a 3 Meter antenna to a 15 Meter antenna which should improve signal amongst trees in Kandeer and in the Bullock Ck region.

EC Soil Mapping of some highly variable blocks has resulted in a first for the Herbert – zonal banded application.
Several blocks have had zonal lime / gypsum applied, some with the Miriwinni truck which is equipped, with variable rate controllers system and auto steer. (see picture of Morley's farm Halifax)
Trimble & HCPSL worked with Walter Giordani to commission variable rate tractor pulled lime/gypsum/mill mud ash applicator. The VR Controller accepts a variable rate map produced by HCPSL

Targeting mill mud ash, lime and gypsum within the paddock at variable rates is aimed at improving productivity whilst not increasing costs above what the farmer has traditionally spent with "broad acre" spreading.



Left: A variable rate gypsum map produced by HCPSL

Miriwinni truck on Morley Farm VR 50/50 Lime Gypsum

VR applicator at Wal Giordani's

CRC for High Performing Soils
By Lawrence Di Bella

HCPSL has signed up the CRC for High Performance Soils in 2017. The CRC is to develop ways to improve and monitor soil health. HCPSL is one of nine grower groups who are involved and steer the direction of the research, development and extension focus to be undertaken by the affiliated universities. HCPSL is the most northern grower group in Australia and one of only two cane grower groups (BPS being the second group), with other groups from WA, SA, Victoria, Tasmania, NSW, Queensland and New Zealand. To date it is interesting that most issues concerning soil health and monitoring soil health are similar across industries.

The past 2 months have been busy concerning activities within the CRC. HCPSL has been involved in the following activities:

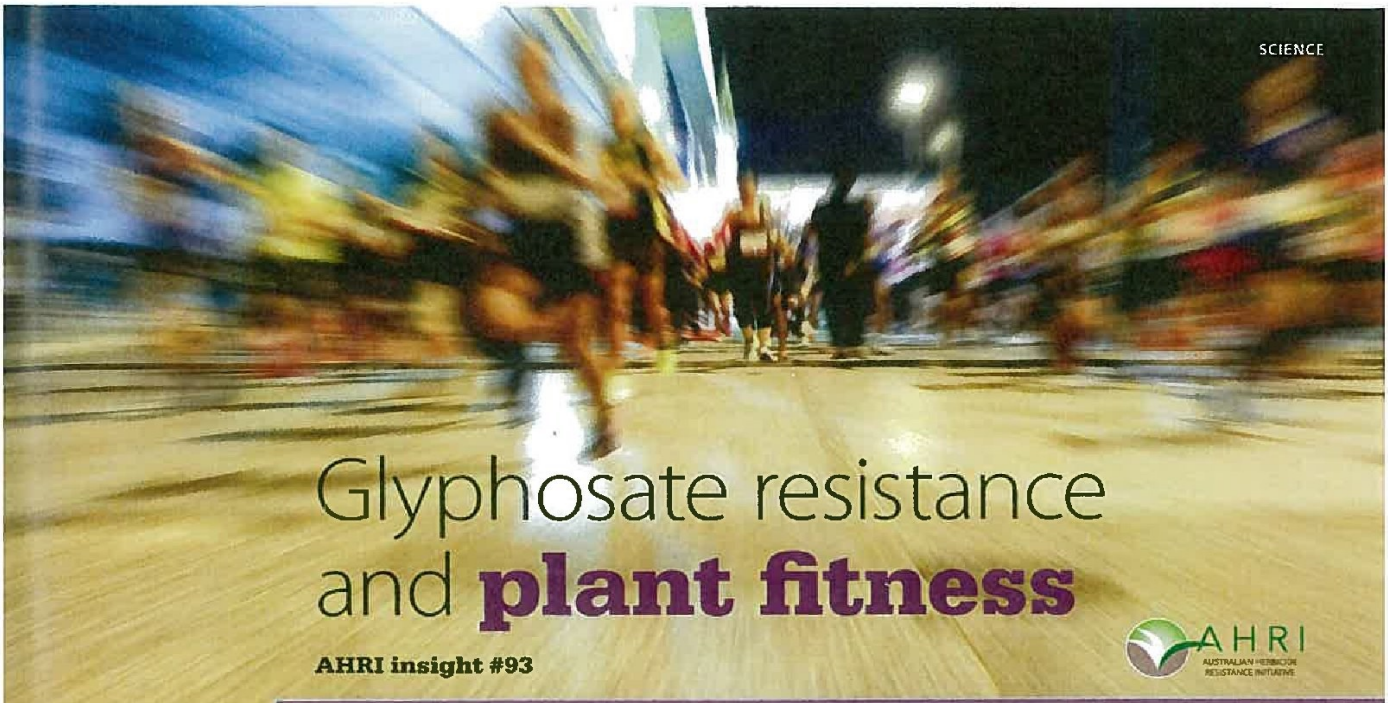
- Lawrence Di Bella attended a meeting in Brisbane and Melbourne to scope out projects to be funded within the CRC.
- Lawrence Di Bella, Richard Hobbs and Shannon O'Brien attended a workshop in Townsville to identify soil health issues concerning the cane industries of the Herbert and Burdekin; with a number of growers invited from each district to attend.
- Development of project proposals for funding consideration.

The project proposals in which HCPSL is involved in are as follows:

- Investigating the impact of mixed legume fallow and companion cropping and extension of findings to the farming community.
- Develop more robust technologies to deliver rhizobia to legume crops.
- Development of on the go sensors to measure differences in soil chemistry levels (ie.carbon, pH, nitrogen and phosphorus).
- New technologies to better deliver imidacloprid in cane systems to manage cane grubs, while managing environmental issues.
- Tools to better measure soil health.
- Extension- training the industry on soil health and what it really means.

Lawrence Di Bella has been significantly involved in the development of these projects with CRC partner groups. Successful projects will be announced in the next few months. HCPSL involvement will vary significantly between projects from staff funded to undertake on ground activities and to supporting agencies undertaking activities in our region (through identifying trial co-operators). A large positive for this CRC is that the grower groups will be embedded in all projects and will be responsible for extension delivery of the research and development outcomes from the projects operating within their regions.

For more information on the CRC HPS go to: http://www.soilcrc.com.au/



SCIENCE

Glyphosate resistance and **plant fitness**

AHRI insight #93

AHRI
AUSTRALIAN HERBICIDE RESISTANCE INITIATIVE

Things that affect your fitness:

Christmas – go on, have one more serving of trifle, it is only wafer thin!

Television – for example, spending five full days watching the Boxing Day Test match.

Each on their own are not too bad, but put them together and we have a problem.

Things that affect plant fitness:

The TIPS mutation that causes high level glyphosate resistance.

The TIPS mutation is a double mutation of the glyphosate target site, the 102 and the 106 mutation. The 106 mutation has been found in a number of species and has no fitness penalty associated with it, but the 102 + 106 mutation comes with a big fitness penalty.

AHRI researcher Heping Han, along with others with GRDC support, recently found a large fitness penalty in glyphosate-resistant Crowsfoot grass.

> We have previously reported on this glyphosate resistance here: https://ahri.uwa.edu.au/nature-mimics-science/

At the time we could see by looking at the pictures of the plants that the ones with the homozygous TIPS mutation were severely stunted. The researchers have now further investigated this and found that the homozygous TIPS plants have 50% reduction in seed set and this escalates to 85% in plants that are in competition with a rice crop.

Most of the known glyphosate resistance mechanisms cause fairly low level (4 to 8-fold) resistance. The TIPS mutation causes huge resistance—140 to 180-fold—with some plants surviving more than 57 L/ha glyphosate.

Will this fitness penalty help keep the TIPS mutation at bay? Unfortunately not. There is a twist in the tail of this story.

The glyphosate resistant Crowsfoot grass (*Eleusine indica*) in this study was from a palm nursery in Malaysia and was the topic of Adam Jalaludin's PhD at AHRI. This Crowsfoot grass is not only resistant to glyphosate, it's also resistant to paraquat and glufosinate as well. Nasty customer!

> You can read about this triple knockdown resistance here https://ahri.uwa.edu.au/triple-knockdown-resistance/

The mutations

The table below describes the four different biotypes of Crowsfoot grass that were compared in this study. Essentially, they studied a susceptible Crowsfoot grass (wild type) compared to a biotype with just the 106 mutation, another with both the 102 and 106 mutation (RR TIPS), and a cross between the two (Rr TIPS).

	Description	Resistance level	Zygosity
WT	Wild type. No mutations	Susceptible	Homozygous
P1065	Single mutation	Moderate level resistance	Homozygous
RR TIPS	Double mutation	Very high level resistance	Homozygous
Rr TIPS	TIPS mutation on one chromosome and 106 mutation on the other	High level resistance	Compound Heterozygous

SCIENCE

A quick refresher: what do homozygous and heterozygous mean?

A diploid species (like humans, ryegrass, crowsfoot grass, etc.) has two matching sets of chromosomes. When a particular gene is identical on each chromosome we call it homozygous.

When a particular gene (e.g. the gene for glyphosate resistance) is found on one chromosome only, it is called heterozygous.

A compound heterozygote is where there is one mutation on one chromosome and a different mutation on the other. In this case, one chromosome has the 106 mutation, and the other has the 102 + 106 (TIPS) mutation.

Fitness

The photo below shows just how unfit the grass with the homozygous TIPS mutation is. These plants have not been treated with any herbicide. The reduced growth of the homozygous TIPS plants is simply as a result of the TIPS mutation. This photo also shows that the single 106 mutation has no effect on plant fitness.

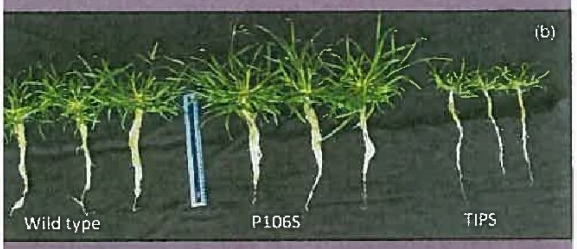
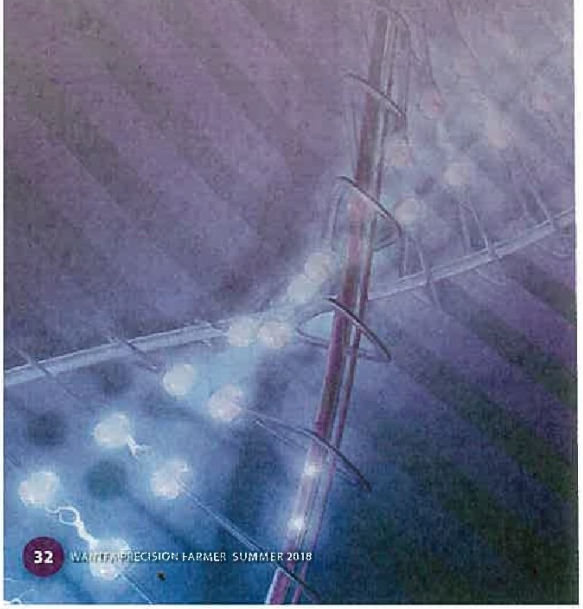
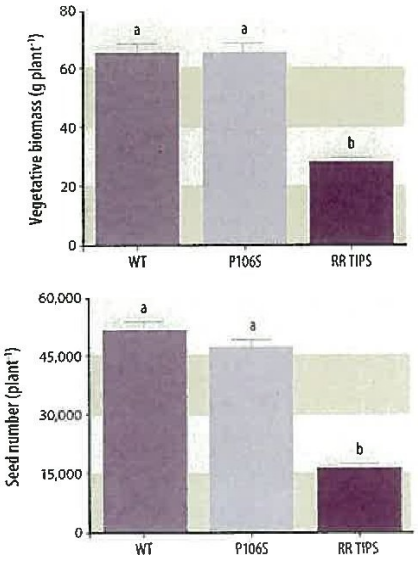


Figure 2. (a) Vegetative growth of *Eleusine indica* wild type, P106S and homozygous RR TIPS plants, 24 days (not shown) and (b) 34 days after germination growing outdoor under summer conditions in the absence of glyphosate treatment.



Biomass and seed set

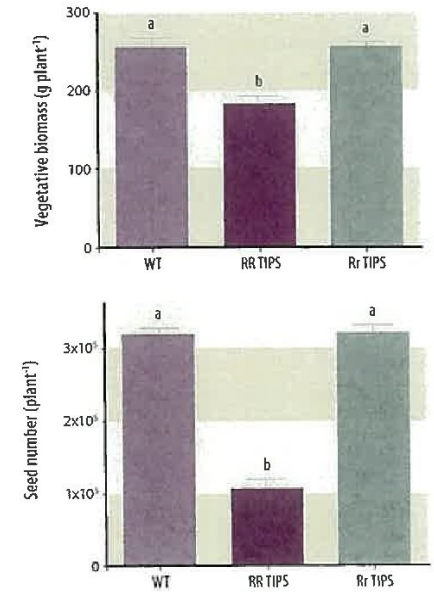
The data below shows the scale of the effect of the homozygous TIPS mutation on biomass and seed set. These plants were grown in the absence of crop competition, and with no herbicide applied.



Only the homozygous TIPS plants have a fitness penalty — this is the twist in the story.

This is a major bummer! Only the plants with two copies of the TIPS mutation have the fitness penalty. These are the plants with the RR TIPS in the graph below. The Rr TIPS plants have one copy of the TIPS mutation and one copy of the 106 mutation. This is what's called a compound heterozygote. These plants don't have the fitness penalty. These Rr plants have high-level glyphosate-resistance and no fitness penalty. This is the important message out of this study.

If all plants with the TIPS mutation had a fitness penalty, then we could potentially eradicate these extremely resistant plants from a population over time due to the big fitness penalty. But unfortunately, we have plants (Rr) that are highly resistant that have no fitness penalty. This would be a nightmare if it happened in ryegrass.



Now throw in some crop competition

The graphs below show the effect of crop competition when the weeds were sown in competition with rice plants. The crop reduced the growth of all of the crowsfoot grass, but the ones with the homozygous TIPS mutation (dark bars) suffered a lot more than the susceptible (mid-tone bars) and plants with the 106 mutation (light bars).

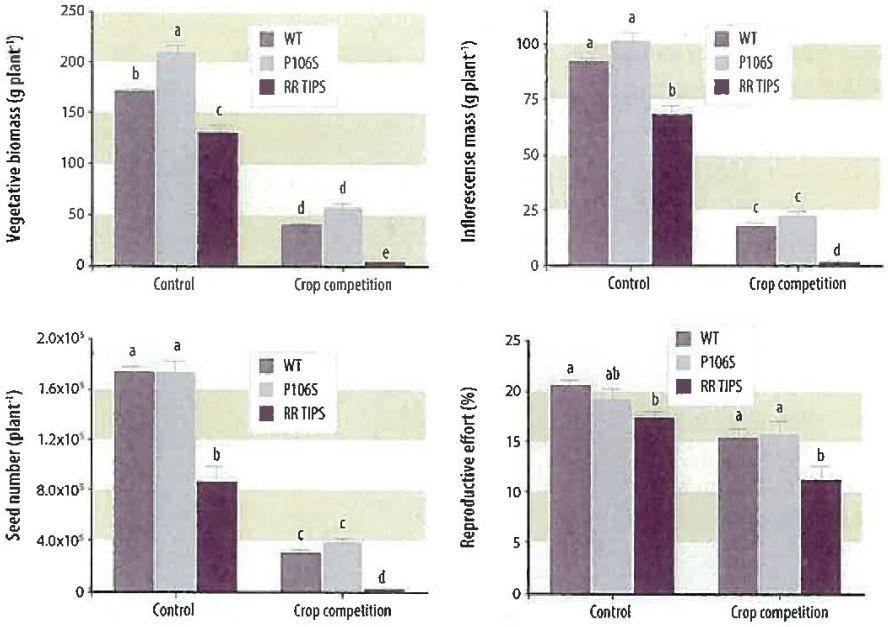


Figure 5. Fitness traits of *Eleusine indica* wild type (WT ■), P106S ( ) and homozygous RR TIPS (■) plants under resource competition from rice in a glyphosate free environment. Traits were estimated at plant maturity after 98 days of growth since germination under field conditions (November 2014 – February 2015). Vertical bars denote standard errors of the mean (n = 10, except for reproductive effort n = 5). Different letters indicate significant differences according to Tukey's multiple comparison text (α = 0.05)

summary

Yes, there's a big fitness penalty for glyphosate-resistant crowsfoot grass with the homozygous TIPS mutation

but

plants with the heterozygous TIPS mutation are also very glyphosate-resistant, but have no fitness penalty.

If resistant weeds have a fitness penalty we can develop strategies to eradicate these plants as they will struggle to compete with the susceptible weeds and the crop. But unfortunately, not all of our highly resistant weeds have a fitness penalty.

If this TIPS mutation can happen in one weed species it can happen in others. Most of our glyphosate resistant weeds to date in Australia have fairly low-level resistance. This is likely to change in the future as we select for other resistance mechanisms. Studies like this one will help us understand and prepare for these future resistance problems when they inevitably occur.

AHRI AUSTRALIAN HERBICIDE RESISTANCE INITIATIVE

The research team

This paper was a collaboration between AHRI researchers Heping Han, Qin Yu, and Steve Powles, as well as past AHRI researchers Adam Jalaludin and Martin Vila-Aiub.

Harvester Sugar Loss Testing Service

If you would like to maximise the amount of cane you can harvest from your field or access the potential sugar you maybe losing at harvest, HCPSL is offering a service where-by a team can come out to work with the grower and harvesting contractor.

For more information on the testing service go to the HCPSL website Home Page. At the bottom of the home page you will find a Youtube Clip explaining the testing service.

For more information on the service, please contact Lawrence Di Bella (HCPSL Manager) 0448 084 252 or contact the HCPSL office 47 761808 to arrange a harvestor test.

CANE CRUSHING SEASON 2018

HCPSL would like to wish all a safe and productive cane season for 2018.

All seed plots are open, please contact the office with at lease 1 days notice of going to the plot.

SRA Soil Health Project
By Richard Hobbs

This is a new project funded by Sugar Research Australia (SRA) to look at how an Improved Farming System fit and operate in a sugar cane farming operation in the Herbert and Burdekin districts. HCPSL and Burdekin Productivity Services along with SRA, University of Queensland (UQ), University of Southern Queensland (USQ) and QDAF are the principle contributors to the project. This project will run for 5 years (plant and 4 ratoons).

This project will measure various forms of soil health including nutritional, biological, chemical, physical properties as well as financial (gains/losses). To start the project off we needed 3 growers where we could conduct these trials. These trials are a comparison of the grower's standard practice compared to an Improved Farming System (IFS). This trial is not to say one is better than the other, but to see the benefits of an Improved Farming System and how it can improve soil health resilience and manage costs.

During the trial we will be measuring the nutritional, physical, chemical & biological levels within the blocks at various stages. Stages will be: within 2 weeks of harvest before fallow, at the end of fallow pre-plant, plant cane at out of hand stage, plant and ratoon cane post-harvest. A suit of soil health tests will be conducted including soil tests, root sampling, water infiltration, bulk density, penetrometer and gravimetric soil tests & 6-month bio-mass sampling of the cane. Additional 10 trials will be carried out through the district on paired sites, sampling different farming systems using the same tests as the 3 demo sites.

In the fallow farmers did what they usually do (e.g. lime, spray out or working the soil to destroy volunteer cane, plant legumes or grassy fallow). After the wet the growers will work their ground prior to planting. In the IFS section of the trial we planted a 4-species legume crop (Leichhardt Soybean @ 10kg/ha, Ronghi LabLab @8kg/ha, Calypso Cowpea @8kg/ha, and Sunn Hemp @6kg/ha) on mounds. All IFS legumes were inoculated with Rhizobium bacteria, so nitrogen can be fixed to the rooting system. At the end of the wet season we will spray out the legume crop and do minimum cultivation (one or two passes) and plant.

At planting the grower will plant with his standard method and row spacing, while the IFS will be planted using a mound planter and wider row spacing (1.80 -1.83m). Through the trial 6 Easy Steps will be used to determine the correct nutrient rate. Herbicide spraying will be carried out on an as need basis. Both farming systems will be harvested for 5 years and with individual weights and CCS obtained from the mill.

For further information concerning the project or you are considering adopting new farming practices and need help, please contact Richard Hobbs (HCPSL Extension Agronomist) 0400 544 301.

Mixed legumes covered with Rhizobium Inoculant

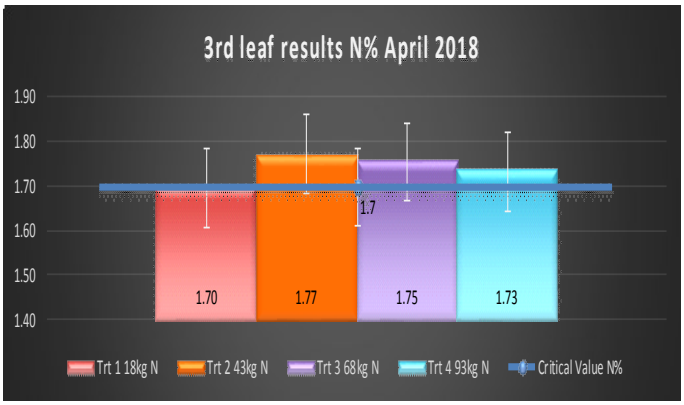
Mounding and planting legumes on 1.80m rows

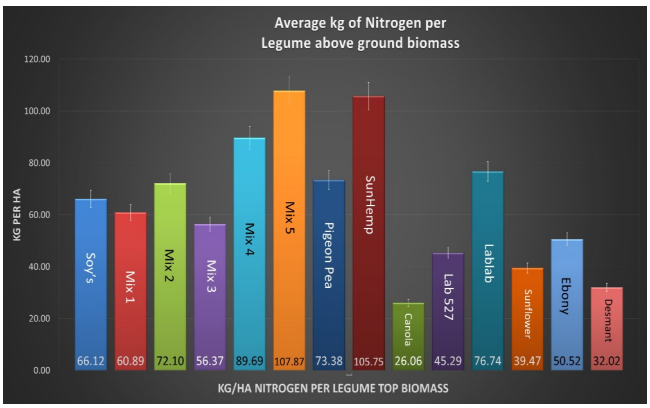
Project Catalyst
By Megan Zamhel

Project Catalyst currently have 14 trials established with 3 new trials being established this harvest season. Trials to date are:

Trial Name		Grower Name	Early Adopters/ Innovation	Year Started
Small Plot trials				
Biodiversity in Fallow	Looking at mixed legume crops to reduce nutrient inputs @ planting & improve soil oragnic matter & carbon	Lawrence DiBella	Inn/New	2016
Meat Chickens as a roation with Cane	To see if chickens in roation with cane crops is beneficial in reducing nutrient inputs and improve soil carbon	Daniel Cordner	Inn/New	2016
Ozcal	To see if a fine prilled lime works at shifting pH effectively and that there are no P tieups by mixing this product with fert blends	Stephen Accornero	Inn/New	2018
Strip Trials				
SOSBio Microbes	This is a granulated microbial product. The aim is to see if it will improve nutrient uptake and extend ratoon longevity	David Morselli	Inn/New	2018
Banded Mill Mud	To see if banding mill mud onto ratooning stools will have a positive effect on ratoon life	David Morselli	EA/New	2018
Ozcal	To see if a fine prilled lime works at shifting pH effectively and that there are no P tieups by mixing this product with fert blends	Stephen Accornero	Inn/New	2018
Variable rate Gypsum trial	To see if there are benefits of having variable rates of gypsum compared to conventionally applied gypsum	Walter Giordani	EA/New	2018
Entec @ reduced rates	A Bang for buck trial. Reduced the cost of entec to compare against conventional fert blend	Anthony Marino	EA/Existing	2015
Biofertiliser to reduce nutrient inputs	Using biofertiliser to reduce chemical fert inputs	Anthony Marino	Inn/New	2017
Lime Products trial	Comparing lime products to see which works best at shifting pH levels within soil	Alan Lynn	EA/New	2017
Biofertiliser to reduce nutrient inputs	Using biofertiliser to reduce chemical fert inputs	Sergio Fighera	Inn/New	2017
Sub-surface Mill by-products	By applying mill by procducts via sub-surface application, this will hopefully reduce mill by products from leaving the block	Wilmar	EA/New	2016
Serenade Prime in ratoons	A microbial product applied at fertilising time to help improve ratoon longevity and improve nutrient uptake	Norm Reid	EA/New	2016
Soil Biology to improve NUE	Microbial products to help improve nutrient uptake	Gino Zatta	EA/New	2016
Microbial products trial	Comparing different microbial products to improve ratoon longevity and nutrient uptake	Tom Gilbert	EA/New	2017
Sunn Hemp N rates trial	To see how much the nitrogen rate can be reduced after a Sunn Hemp legume crop	Richard Hobbs	Inn/New	2017
K-Humates trial	To see if a humates product can improve the cation exchange capacity and improve nutrient uptake by the plant on a reduce N rate.	Norm Reid	Inn/New	2017

Results coming out from some of the trials.



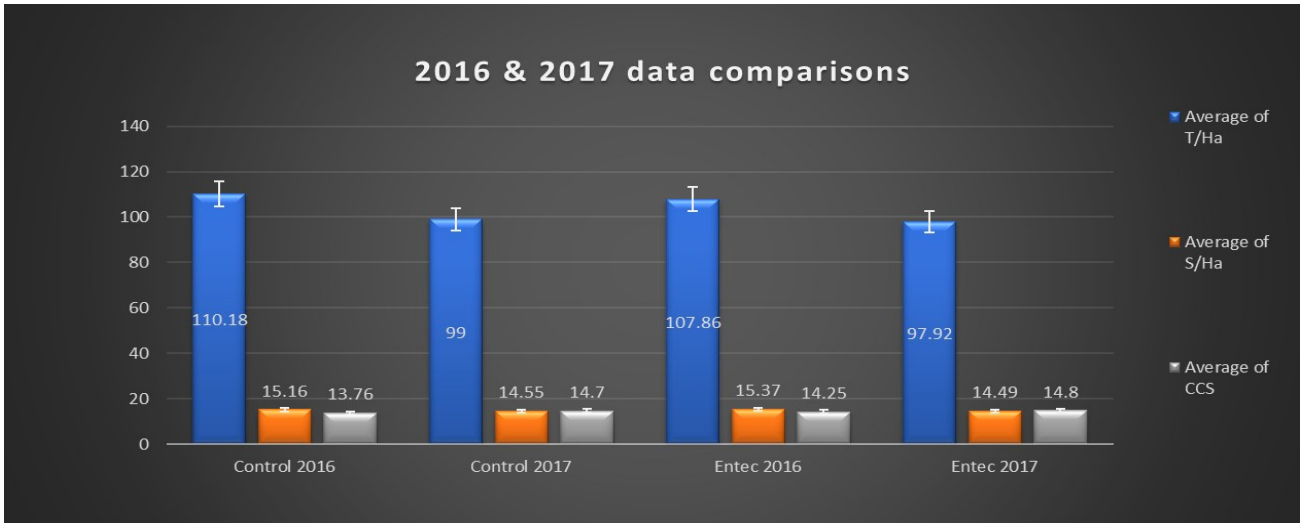


Sunnhemp Nitrogen Rate Trial (Above left)

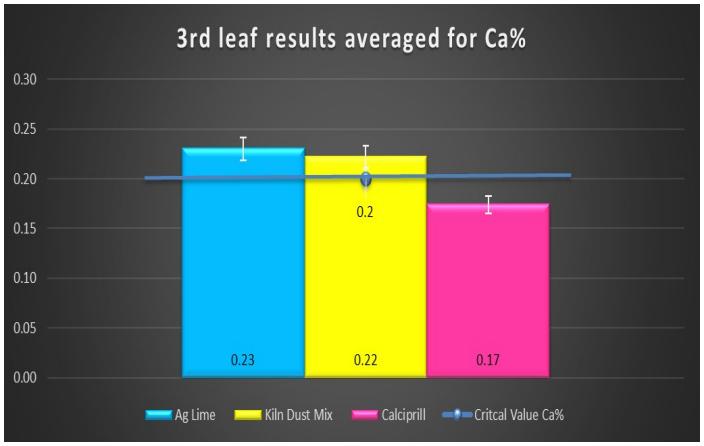
Recent leaf results from the Sunn Hemp trial indicate that the reduced rates of N treatments still have critical levels of nitrogen within the plant and that there are no significant differences between the lower and higher N rates. This trial will be harvested late this year and the result will be reported to the industry later in the year.

Mixed Fallow Cropping Trial (Above Right)

The Biodiversity in fallow cropping is producing some good results with promising outlooks on being able to reduce chemical fertiliser rates majorly in plant cane after a good mixed legume crop.



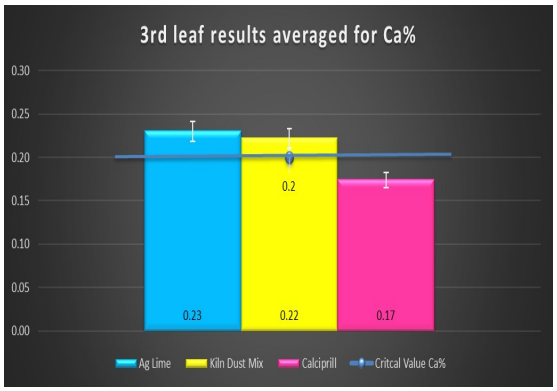
To date there has been no significant yield loss with reduced nitrogen rates when using Entec. (Above)

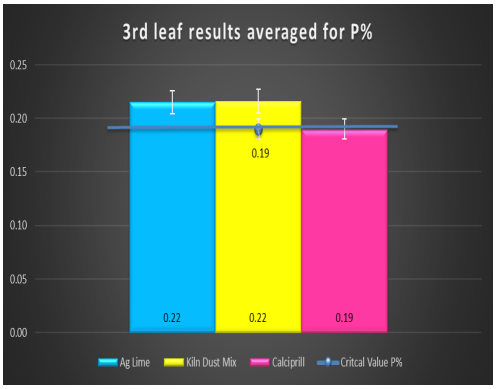


Graphs above and on the opposite page.

Comparing Lime Products Trial

There is some interesting data coming from the lime Products trial. Results are showing that traditional Ag Lime is producing the best results with a pH shift up to 5.8 and Ca critical values in the leaf results are in the optimum range. Calciprill - the fine prilled lime product is showing minimal shift in pH, with a shift from 4.7 to 5pH over a thirty week period. The Ca levels in the leaf results also show that Ca critical values are under in the Calciprill treatments, and P values are borderline.





Subsurface mud & ash trial. This trial is showing promising outcomes with reduced rates of mill mud & ash.

Treatment	Average TCH	Average TSH	Average CCS	Average $/Hectare
Control	101.0	16.9	16.8	$ 3,532
Mud banded 50t/ha	102.9	17.0	16.5	$ 3,488
Mud banded 100t/ha	105.5	16.9	16.0	$ 3,144
Mud broadcast 200t/ha	112.5	16.3	14.5	$ 2,262
Ash banded 50t/ha	106.4	17.4	16.3	$ 3,543
Ash banded 100t/ha	105.3	16.9	16.1	$ 3,147
Ash banded 200t/ha	108.9	16.8	15.5	$ 2,538

For more information on Project catalyst trials and activities can be found on the HCPSL website under the project icon or contact Megan Zamhel (Project Catayst Support Officer) on 0447 317 102.

2018 Grower update

HCPSL and SRA jointly hosted the 2018 Grower update that was held on the 10th of April.
The event was attended by about 60 people.

Topics presented:

- A plant breeding target- Jason Eglington; SRA Senior Plant Breeder
- Managing CCS through crop ripeners- Lawrence Di Bella; HCPSL Manager
- Getting more cane from approved seed plots- Graeme Holzberger; HCPSL Extension Agronomist
- Soil Health- What does it mean- Davey Olsen; SRA Senior Research Officer
- What's new with YCS- Frikkie Botha; SRA Program Manager
- Blocked plumbing in YCS- Gerard Scalia; Senior Research Officer.

The Herbert Walk and Talk Day

The Herbert Walk and Talk Day was well attended with over 100 people attending the event. The event was jointly hosted by HCPSL and WTSIP, with WTSIP and Mirriwinni Lime sponsoring the event. The 2017 industry awards were presented over lunch.

Presentations on the day are as follows:

- Comparing Sinker and Shirtan in a glasshouse trial- Nick Matthews (Nufarm) and Graeme Holzberger (HCPSL)
- Sempra to control Nauva sedge- Nick Matthews (Nufarm)
- Varieties and variety management- Melanie Adams, Dr. Hu (SRA) and Sam Sellick (HCPSL)
- Getting the most out of lime and gypsum- Mirriwinni Lime and Leanne Carr (HCPSL WTSIP)
- Managing soil health- Davey Olsen (SRA), Megan Zamhel (HCPSL), Ben Pogloi (Nifty Ag)
- Financial Services- Coscer Accounants and Nick Birchley (consultant)
- Managing nitrogen better- Greg Wells and Kate Daly (DOW AgroSciences) and Adam Royle (HCPSL)

Photos above left: The Soil Health tent at the 2018 Herbert Walk and Talk Day
Photo above middle: Rod Nielson (HCPSL) discussing PA at the Herbert Walk and Talk Day
Photo above right: Growers discussing varieties at the Herbert Walk and Talk Day.

HCPSL SOIL TESTING GUIDELINES

Why do I need to do soil tests?

Soil testing is required prior to planting to calculate the optimum amount of nutrients to apply to your farm. This will inform the nutrient requirements of your crop, save money and reduce the risk of surplus nutrients ending up in waterways. It is a legal requirement to undertake soil testing of blocks to be planted.

What do I need to do?

The most effective time to sample is just after harvest of the last ratoon of the previous crop cycle. You can also have soil samples analysed from late crop cycle ratoons to indicate the presence of any agronomic issues to be corrected prior to establishing a fallow crop.

For soil testing services and nutrient recommendations, contact a HCPSL fertiliser industry advisor who meets the national competency standards provided in *The method for soil sampling and analysis for sugar-cane properties regulated under the Environmental Protection Act 1994.*

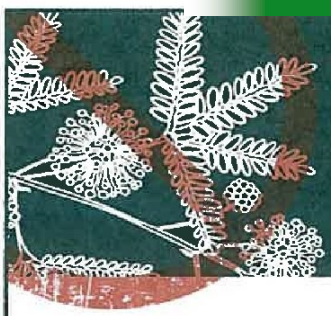
	**Obtain a soil map** Use a map to define and record the soil sampling locations. Maps can be obtained from HCPSL or the Wilmar grower web.
	**Select representative blocks for sampling** select areas for soil sampling that represent the soil types and nutrient management regimes of the blocks being planted.
	**Sample collection** Soil cores should be collected from the shoulder of the cane row, making sure no trash is included in the sample. Avoid sampling handlands and poorly drained areas. If possible record a GPS location for each soil test.
	**Send samples for analysis** Drop soil samples into HCPSL for nutrient analysis. Pachymetra rootrot and nematode testing can be done at the same time.
	**Record keeping** Keep your soil test results and a map identifying farm blocks and sampling locations for five years.

Before you carry out a soil test, you can refer to:

The method for soil sampling and analysis for sugarcane properties regulated under the Environmental Protection Act 1994 which describes the tools and method in full required to sample your soils correctly.

It is available at www.qld.gov.au/FarminginReefCatchments

Queensland Government



BECOME A WEED BUSTER TODAY!

HINCHINBROOK SHIRE COUNCIL

Hinchinbrook Shire Council would like residents to be aware that after recent flood events there is an increased risk that new and emergent weed species may be spreading into our district, particularly in areas where flood waters have entered. Recent floods were primarily the result of water traveling down from the Upper Herbert River Catchment which has increased the possibility of the dispersal of weed species such as Gamba Grass, Siam Weed and others that have previously not been prevalent in the Shire.

Councillor Kate Milton has said, "It is important that landholders become aware of these weeds and how to identify and control them. The cost of weeds to Australian Agriculture now exceeds $4 billion per year and if weeds are spotted early landholders have a much better chance of eradicating them. Controlling 10 plants is much easier than having to deal with 10 acres of them."

ABOUT THIS GUIDE

The following information is to be used as a guide for identifying and managing weeds in the Hinchinbrook Shire. Please keep this guide to refer to later. For more information please contact Council's Environmental Services Unit.

HOW TO IDENTIFY WEEDS

In simple terms, a weed is a plant out of place. Weeds are able to spread rapidly and have unwanted economic, environmental and social impacts.

Weeds can be difficult to identify, and may be confused with plants that are not weeds, including native or endangered species, with some weeds also varying in appearance during juvenile and mature stages. It is important to correctly identify a weed to ensure that control methods are effective and appropriate. Some factors to consider when identifying a weed are where and when the weed grows, its shape, size, leaf form and flower colour.

KEY CONTACTS

Hinchinbrook Shire Council's Environmental Services Unit	4776 4607
Herbert Cane Productivity Services Limited (HCPSL)	4776 1808
Queensland Herbarium	3896 9326

Visit your local agricultural supplier for further information regarding chemical treatments.

TOOLS TO HELP IDENTIFY WEEDS

These tools can help you identify weeds on your property.

WEED SPOTTER APP

The Weed Spotter App allows you to email photographs of plants to the Queensland Herbarium for identification. It has been developed to support the Weed Spotters Network, a joint project between the Queensland Herbarium, Biosecurity Queensland and local governments with funding support from the Land Protection Fund.

The Weed Spotter App is now available for Android smartphones via the Google Play Store.

IDENTIFYING WEEDS FROM SPECIMENS

If you cannot identify the plant using online tools or weed identification publications, you can take a sample to Hinchinbrook Shire Council or send a sample to the Queensland Herbarium for analysis.

Please note: There is a specific process involved in collecting and preparing weed specimens for identification. For information on how to correctly prepare a specimen for analysis please visit the Queensland Herbarium website or contact Council's Environmental Services Unit.

WEEDS TO BE ON THE LOOKOUT FOR

GAMBA GRASS

Gamba Grass is an introduced weed that competes strongly with native pasture. Its high biomass can fuel intense bushfires damaging ecosystems and threatening the safety of people and property. Gamba Grass infestations have spread extensively across various landscapes where it has significantly altered soil-nutrient cycles, water cycles and fire regimes.

If this species establishes locally it will seriously threaten critically endangered ecosystems and animal species such as the last remaining mahogany glider populations locally and abroad.

DESCRIPTION

Gamba Grass is a perennial species introduced from Africa. It has many cultivars which have the following key features:

- Mature plants grow up to four metres tall with tussocks up to 70cm in diameter
- Leaves are 30 to 60cm long and up to 3cm wide, with a distinctive white midrib and covered with soft hairs
- Stems are robust and covered in soft hairs
- The root system spreads up to one metre from the tussock, close to the soil surface
- It reproduces from seed
- Seeds are contained in a fluffy V-shaped seed head consisting of up to six groups of branches, each containing between 2 and 18 primary branches

DISTRIBUTION

Gamba Grass reproduces by seed and spreads rapidly where the natural vegetation has been disturbed. Dispersal has been aided by the sale and historical distribution of the plant as a commercial pasture plant. Gamba Grass has also been spread when transported as hay and on roadside slashers.

Although not currently known to be found locally, there is the potential for this species to have made its way into our Shire from the upper catchment during the March 2018 floods. It is important that if found Council is notified immediately so officers can ensure a management program is implemented before it establishes.

IMPACTS

Gamba Grass infestations have spread extensively across various landscapes where it has significantly altered soil-nutrient cycles, water cycles and fire regimes in the following ways:

- Gamba Grass infested landscapes carry up to eight times higher fuel loads than native forest and pastures
- Bushfires are extensive with increased intensity and heat, which affects the tree canopy, transforming woodlands to grasslands. This also poses a serious threat to people and property.
- The changing demands for nutrients and water over a large area can alter catchment hydrology and downstream wetlands and watercourses
- Competition with crops such as sugarcane, grain and horticulture

CONTROL METHODS

Pasture management

Gamba Grass should be grazed with enough stock to keep it below a height of 90cm so that seed production and potential spread is limited. This ensures that plants do not become tall and rank in the dry season and reduces potential fire hazards. Stocking rates to achieve this may be as high as five animals per hectare during the peak wet season. Maintaining pastures in good condition with high crown and foliage cover will provide some resistance against Gamba Grass invasion and the spread of existing infestations. Pastures that are in poor condition or overgrazed are at a greater risk of invasion by Gamba Grass due to bare soil and the reduced vigour of existing grass species.

Physical control

Hand pulling or digging out isolated plants is an effective control method. Ensure excess soil is shaken from the roots to prevent regrowth. Slashing to reduce seed set or to remove old rank growth should be done before seeding and after seeds have dropped to reduce the risk of seed spread. This will also improve the effectiveness of applied herbicides and reduce fire hazards. Weed seed hygiene protocols must be observed for machinery, vehicles and people working in Gamba Grass areas.

Fire

Gamba Grass is tolerant to fire at any time of the year. Burning Gamba Grass in the dry season can be hazardous to property, people and livestock due to the high fuel loads and height of the plants, which create an extremely intense fire. Gamba Grass should be burnt only to reduce fire hazard, limit seed set and remove old rank growth. This will also improve herbicide control. Low intensity burns early in the wet season can remove old rank growth and promote new growth suitable for herbicide application. These fires can also control young Gamba Grass seedlings, reducing the establishment of new plants. Gamba Grass should not be burnt when plants have mature seeds as the updrafts caused by the fire may spread the light fluffy seeds across large distances.

Herbicide control

Gamba Grass should be sprayed early in the wet season (when leaves are at least 40cm long) or well before May to prevent seeding and potential spread. Spraying early makes herbicide application easier as plants are smaller, less herbicide is required and good coverage is achieved. Every part of the plant should be sprayed to ensure adequate herbicide uptake. Care should be taken to limit overspray as considerable damage can be caused to non-target plants. An off-label use permit allows the use of various herbicides for the control of Gamba Grass in non-agricultural areas, bushland and forests.

When spraying herbicides within a cropping situation, it is important that the product is registered for use within the crop.

Visit your local agricultural supplier for further information regarding chemical treatments.

NAVUA SEDGE

Navua Sedge is extremely aggressive and competes strongly for nutrients, light and moisture and is capable of forming dense stands that can smother many tropical pasture species. This species is already invading high valued pasture land within our Shire and residents and landowner assistance is required in managing this species.

DESCRIPTION

Navua Sedge is a vigorous grass-like, perennial sedge. It normally grows 30 to 70cm in height, but may occasionally reach two metres. The plant has a continuously growing underground stem which produces shoots at regular intervals along its length. These interconnected plants then develop an extensive shallow fibrous root system. Each plant has a cluster of drooping leaves at the base of the stem, with each leaf being approximately 5 to 15cm long and 3mm wide. The flower stalk is triangular with the flower at the apex of the stalk. Immediately under the white knob-like flower are six leaf-like bracts. Three of these are long and three are short. The seed is egg shaped with a hook on one end, and brown to black in colour.

DISTRIBUTION

Navua Sedge prefers areas with an annual rainfall exceeding 2500mm, without a distinct dry season. In areas where there is substantially less rain and a distinct dry season, it is generally restricted to damp, low-lying parts in pastures, drains or disturbed areas. Recent years have seen the species spread rapidly in the lower floodplains of the Herbert River.

IMPACTS

Navua Sedge outcompetes pastures and displaces native grasses and sedges. The plant is allelopathic, releasing a toxin which inhibits the growth and germination of other plants. It is difficult to control selectively and can decrease productivity significantly, particularly in land used for cattle production. Navua Sedge can also be a problem in sugar cane where the crop is light with poor canopy cover. It reduces crop yields and can stall the basecutter on a cane harvester.

CONTROL METHODS

Mechanical control

Physical removal is possible for small clumps. Each clump has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered. For large infestations, it may be possible to bring the underground roots to the surface by discing and allowing them to dry out. The effectiveness of this technique can depend on the weather, since considerable regrowth would be expected in damp conditions. Any mechanical techniques that contribute to deeper seed burial are likely to prolong seed longevity and reduce seed losses in the paddock. Mechanical control methods are generally not a long-term solution and require repeated applications.

Pasture management

Maintaining pastures in good condition with high crown and foliage cover will provide some resistance against Navua Sedge invasion and the spread of existing infestations. Pastures that are in poor condition or overgrazed are at a greater risk of invasion due to bare soil and the reduced vigour of existing grass species.

Herbicide control

Treatments that include herbicides are the most effective option for controlling Navua Sedge stands.

Sempra® herbicide used in conjunction with the wetting agent Bonza® is currently the only selective herbicide registered for Navua Sedge control. Unfortunately, due to the competitive and persistent nature of Navua Sedge, regular application of herbicide will be required.

The herbicide should be applied during February to October when Navua Sedge is actively growing and prior to seed set.

A minimum re-treatment interval of 10 weeks between consecutive applications should be adhered to, and a maximum of three foliar applications per year can be applied to the same area.

Use of Sempra® imposes a withholding period on livestock grazing on the treated area. Do not graze for livestock, cut for fodder or forage for 10 weeks after treatment.

When spraying herbicides within a cropping situation, it is important that the product is registered for use within the crop.

Visit your local agricultural supplier for further information regarding chemical treatments.

GIANT RAT'S TAIL GRASS

DESCRIPTION

A robust, tufted, perennial grass growing up to two metres tall. Often difficult to distinguish from other pasture grasses before maturity. However their leaves are noticeably tougher than those of any other species.

DISTRIBUTION

Widespread distribution within the Hinchinbrook Shire, often associated with road and rail transport, areas of disturbance or fallow and unused land.

IMPACTS

Giant Rat's Tail Grass is invasive and can reduce pasture productivity, out compete desirable pasture grasses, and cause significant degradation of natural areas. It can also cause significant damage to the teeth of grazing animals.

CONTROL METHODS

Foliar spray, aerial or spot pellet application, hand removal and pasture management.

CANDLE BUSH

DESCRIPTION

A coarse shrub growing up to four metres tall. Prefers open areas and sunlight. Shallow mat root system with distinctive candle-like flowers and spherical yellow petal balls at the bottom. Long, dark brown to black pods grow up from the stem and have two wings.

DISTRIBUTION

A major weed of all river systems and connected wetlands in the Lower Herbert. The heaviest infestations are in the Palm and Trebonne Creek systems. Often associated with floodwaters, road and rail transport and when animals eat and expel seeds.

IMPACTS

Candle Bush invades bushland in wetter areas to form dense thickets. This can impede access to waterways and is suspected of being poisonous to stock.

CONTROL METHODS

Foliar spray and hand removal.

SINGAPORE DAISY

DESCRIPTION

A dense, low ground cover with lobed, glossy leaves and brown/maroon runners rooting wherever they contact the soil. Distinctive yellow daisy flowers are formed year round. The plant spreads mainly from stem, from fragments and runners.

DISTRIBUTION

Singapore Daisy has a limited distribution across the Hinchinbrook Shire.

IMPACTS

Singapore Daisy forms dense mats smothering out native vegetation and pasture. The plant is allelopathic, releasing a toxin which inhibits the growth and germination of other plants.

CONTROL METHODS

Foliar spray and hand removal.

SIAM WEED

DESCRIPTION

A scrambling woody shrub to three metres (higher as a scrambling climber) with distinctive forked leaf venation and purple flush on new leaves. Clusters of white flowers in May-June and October are a key identification feature. Distinguished from other weeds Bluetop, Praxelis and Billy Goat Weed, which all have mauve to purple flowers and are much smaller than Siam weeds' one to three metres in height.

DISTRIBUTION

Widespread but localised in the Upper Herbert from Ravenshoe to Blencoe Creek, now localised and abundant in the middle Herbert River above Abergowrie.

IMPACTS

This species can form dense thickets and outcompete native species and pasture in both disturbed and undisturbed sites. Prefers richer soils in alluvial and riparian zones but will grow in rock and escarpment.

CONTROL METHODS

Foliar spray, hand removal and fire.

GIANT SENSITIVE PLANT

DESCRIPTION

A shrubby or sprawling annual that has four angled branches with a line of sharp, hooked prickles along the angles. Unlike Common Sensitive Weed, Giant Sensitive Plant (GSP) grows as a small to large shrub.

DISTRIBUTION

Widespread distribution within the Hinchinbrook Shire, often associated with road and rail transport, areas of disturbance or fallow and unused land.

IMPACTS

GSP will choke up cane, other crops and grasslands causing loss of crop and pasture production. The seed of GSP can remain viable for many years, even decades, so any measures to prevent spread and establishment in new areas is worthwhile.

CONTROL METHODS

Foliar spray, hand removal, slashing and chainsaw/cut stump.

OLIVE HYMENACHNE

DESCRIPTION

A robust, upright perennial aquatic grass one to two metres in height with distinctive stem clasping leaves.

DISTRIBUTION

A major weed of all river systems and connected wetlands in the lower Herbert. The heaviest infestations are in the Cattle, Palm and Trebonne Creek systems.

IMPACTS

Blocks drainage systems in cane farms. Readily invades and outcompetes native plants in wetlands and waterways. Prevents fish passage and breeding opportunity for key species like Barramundi. Hymenachne can also impede boat access and potentially damage infrastructure like bridges and weirs.

CONTROL METHODS

Foliar spray and fire.

Connect with Council

www.hinchinbrook.qld.gov.au
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4776 4600
@hinchinbrookshirecouncil

This information was produced by the Hinchinbrook Shire Council with contribution from Herbert Cane Productivity Services Limited.

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