Hopeful harvest

Trial blocks yield answers in the search for disease-resistant varieties
Summer 2013-2014
Australian Bananas magazine

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Editorial & Advertising
Rhyll Cronin
07 3278 4786
rhyll.cronin@abgc.org.au

Art Direction & Design
ToadShow
2 Eton Street, Toowong
07 3335 4000
www.toadshow.com.au

Publisher
Australian Banana Growers’ Council Inc.
ABN: 60 381 740 734

Chief Executive Officer
Jim Pekin

Research and Development Manager
Jay Anderson

Office Manager
Alix Perry

Administration Assistant
Kaylee Packer

Board of Directors
Chairman
Doug Phillips

Vice-Chairman
Adrian Crema

Treasurer
Paul Johnson

Directors
Marc Darveniza
Steve Lizzio
Peter Mainsor
Stephen Spear

All mail to
PO Box 309
BRISBANE MARKET QLD 4106

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Cover: The Banana Plant Protection Program’s Dr Mike Smith (left) and David Peasley at the Duranbah trial block.
Photographer: David Hancock.

We are protecting ourselves and the environment...
We are saving time and money...
We are looking after the family’s future...

We are Confidor
Challenges and achievements set 2014 agenda

ABGC Chairman Doug Phillips looks at the year’s major events. With Christmas and the New Year approaching, it’s an opportune time to reflect on some of the challenges and successes of the past 12 months.

Once again it’s a year when the banana industry has been subjected to the whims of Mother Nature. In January, ex-tropical cyclone Oswald affected many of the production regions on the east coast, most notably in south east Queensland and in New South Wales where damage was severe and losses significant.

At around the same time, in Western Australia our counterparts also bore the brute of nature – not through cyclone but an extreme heat wave that significantly damaged fruit and plantations. Just recently, in mid-November, some growers in New South Wales were completing the year the same way it began – more damaging weather, this time hail storms.

Of course banana farmers, like all farmers, are unfortunately accustomed to dealing with the vagaries of the weather. My thoughts during the year have been with all affected growers as they work through these challenges – hopefully bouncing back.

Congress

The biennial Banana Industry Congress was held this year and, as with previous events, was a positive experience. Held at the Palmier Coolum Resort on the Sunshine Coast, it gave growers and supply-chain partners the opportunity to hear about the latest developments in marketing and research being undertaken by industry.

Of course it was also a great opportunity to catch up with old friends during the extensive social program. Congress culminated with our industry Ball at which I had the great pleasure in presenting the Awards of Honour. Recipients were Senator Ron Boswell – a long-term ally of the banana industry; Tony Heirdrich, a former CEO of ABGC who led our industry through some of its toughest challenges; and Mark Nucifora, a north Queensland grower who has provided outstanding service to the industry at the grass-roots level. They are recipients who represent both the diversity of those involved with our industry and the singular focus we have on improving our outlook.

Pest Levy

While at Congress, I reported to members that ABGC had, after consultation with our growers, written to the Federal Agriculture Minister seeking his approval for an Emergency Plant Pest Response (EPPR) Levy. I was pleased to later announce the request has been granted.

Given our industry’s constant engagement with pest management, including the current response to the Banana Freckle outbreak, it’s worthwhile summarising the details here:

- An EPPR Levy to be set at zero, until or unless required in the event of an incursion
- If an incursion occurs, the debt to the Federal Government to be repaid by implementing a positive EPPR Levy, via a thorough advisory and communications process with banana industry levy payers

The importance of this levy cannot be understated as it provides industry with the ability to discharge its financial obligations associated with an exotic pest incursion as defined by the EPPR Deed.

The actual approval of the levy was opportune as it was only a few months later that Banana Freckle was detected on Cavendish bananas within the Northern Territory. Since this detection, ABGC has been working with State and Federal biosecurity agencies and Plant Health Australia to initiate an eradication program.

This program has started and is progressing well. Under the response program, the costs will be shared between the various State and Federal governments as well as industry. Industry’s commitments will be over and above a positive EPPR Levy. We will have more information on this in 2014.

Year ahead

The EPPR Levy is just one item already on the agenda for the New Year. It will be joined by others – probably some others already mentioned here. That’s because many of our industry’s issues revisited us so frequently – the challenges dealt out by Mother Nature are ever present; so are the challenges dealing with bananas in a very competitive marketplace.

My roles of ABGC chairman and grower have made me keenly aware of the difficult times being experienced across our growing regions, particularly with regards to the returns we receive for our product. Please be aware that your industry body continues to work to do everything possible to improve our outlook.

One positive for our industry will be the finalisation of a new Strategic Investment Plan that will guide us through the next five years (see report, Page 8).

Finally, I would like to take this opportunity to wish all growers and supply chain partners a Merry Christmas spent in the company of family and friends, and a happy, safe and prosperous New Year.

Doug Phillips, ABGC Chairman

Events over the past few months have shown the breadth of issues affecting growers and our industry, says ABGC CEO Jim Pekin.

A disease incursion, a proactive approach to farm practices in the wet tropics and some important initiatives taking place in the broader banana sector have been among them.

These events are worth noting here and are just some examples of how the ABGC has been hard at work for the benefit of banana growers.

Banana Freckle

The exotic strain of Freckle, Phylllosticta cavendishii, was found in Howard Springs, south of Darwin, in July. This set off the pre-determined processes under the Emergency Plant Pest Response (EPPR) Deed, signed some years ago by the ABGC, other industries and all government jurisdictions.

Since then, ABGC has worked with the Northern Territory’s Department of Primary Industry & Fisheries (DPI&F), Plant Health Australia, the Northern Territory & Garden Industry Association, and all the jurisdictions through the Consultative Committee on Emergency Plant Pests which determined the pest was technically feasible to eradicate.

I would like to take this opportunity to thank the many hundreds of NT residents for their contribution to helping bananas in a very competitive marketplace.

These are the rural residents in the areas where Banana Freckle has been found – Howard Springs, Batchelor, Riverstone, Lingle, Humpty Doo and Acacia Hills. It was difficult for residents to lose their banana plants but most understood it had to be done to protect the national and NT banana industries. The national industry is worth $500 million at farm gate and many million more if you think about the associated industries involved in transport, farm supplies and produce wholesale and retail.

I also thank the NT DPI&F for their leadership and implementation of the eradication program, especially their Chief Plant Health Manager, Stephen West. At time of writing, the incursion response, including spraying and eradication, is going very well.

The benefits of eradication are far greater than the costs. Nonetheless, the final cost (when it is known) will not be cheap. The banana industry alone will need to repay more than $500,000, assuming no more infected properties are found. As of November 20, 14 such properties have been detected. One of these was a small farm and 13 were residential properties. It has not yet been determined when or what level of EPPR Levy is required to repay our share of the costs.

Reef Rescue

This year the ABGC Board decided to be proactive in regard to the Great Barrier Reef. Our industry is well aware of the need for good environmental farm practices and the need to minimise waste of nitrogen and other farm inputs, therefore the use of Reef Water Quality Grants is a great way to assist growers improve practices, save money and ensure less nitrogen and sediment goes to the Reef. The ABGC successfully negotiated a contract with Terrain NRM for ABGC to appoint a new employee as a Reef Water Quality Grants Officer. Bartle Freer grower Robert Mayers has been appointed and will help banana growers in the wet tropics apply for and implement the grants and adopt associated farm practices required for improved profitability and water quality outcomes (see report, Page 39).

New Federal Minister

On 1 November, ABGC Chairman Doug Phillips and I met with the new Federal Minister for Agriculture, the Hon. Barnaby Joyce. The Minister understands the banana industry and we aim to continue to brief him on our challenges and opportunities.

The ABGC worked with government and industry groups to respond to the NT’s Banana Freckle outbreak.

Hal review

Horticulture Australia Limited (HAL) has commissioned consultants ACIL Allen to undertake a major performance review of HAL, with the final report due in May 2014.

All horticultural farmers’ compulsory levies get collected by the Federal Department of Agriculture and provided to HAL to manage. From our end, the Banana Industry Strategic Investment Plan is implemented through banana R&D and marketing levies, managed by HAL.

HAL comprises a Board, management and staff, and (thirdly) Industry Advisory Committees (IACs). The Banana IAC is a HAL committee and recommends investments for banana R&D and marketing to HAL management.

HAL media release on this noted:

“This performance review will include an examination of the HAL service delivery model against the benchmark of good governance practice. The review will include the membership structure of HAL, the nature and transparency of funding arrangements and its ability to deliver services in an efficient and effective manner while meeting the future and strategic demands of a fast growing industry sector. The review will also determine the efficiency of the existing levy structures and the process by which levies are conceived, implemented, collected and expended.”

I jointly led a committee guiding a consultancy to develop HAL members’ input to this review. The ABGC has also been in talks with various people on this and will make a submission to this review.

Many issues but growers are always our focus

Damage from hail storms south of Coffs Harbour. Storms bookended the year for some NSW growers.

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Storms in east but west stays dry as Summer starts

Dry weather conditions across all growing regions were broken by some November rain on the east coast.

Unfortunately the rain bought damaging storms to some areas, particularly New South Wales, including reports of substantial damage to farms on the mid north coast, just south of Coffs Harbour. In Western Australia, the Carnarvon growing region had no rain in November and only several millimetres of rain recorded in October. Rainfall records show no significant rain in recent months with the biggest reported fall being 20 millimetres in June.

North Queensland has produced record levels of fruit in recent months with November rain and temperatures continuing favourable growing conditions for the start of Summer.

Queensland

In north Queensland, there have been dry conditions but generally mild temperatures during Spring. Growers have been irrigating to keep water up to the bananas.

Good growing conditions in recent months led to heavy production levels in late September, October and November. The wet season officially began on November 1 and storms began bringing widespread rain soon after.

There were some reports of storm damage to a few farms. No major pest issues have been reported although there has been some red spidermite. Leaf spot levels were low in the lead in to the wet season. Fruit quality has been good. According to reports, there has been less nurse sucking this year.

New South Wales

Dry and windy conditions were experienced in recent months. In November, storms brought rain and some hail to the far north and mid north coast regions.

On the mid north coast, Boambee and Bonville, south of Coffs Harbour, suffered significant hail damage to banana crops and some infrastructure. There were reports of major destruction with some plantations completely destroyed. The area was reported to have experienced two severe storms during November – the first causing severe damage and the second following to complete the destruction.

Damage to plants on the worst affected properties was estimated at between 80 to 100 percent. Little or no damage was reported elsewhere in the Coffs District.

Some hail storms were reported in the Nambucca region but there were no damage reports.

Plantations affected by ex-tropical cyclone Oswald in January have returned to production but heavy supply from north Queensland has restricted market demand for NSW fruit.

Western Australia

Lack of water has hampered banana production. Coming off the back of the lowest Winter volumes experienced, growers were not overly impressed but not to the levels of previous years.

Emergency irrigation water was released by the State Government with the Water Department releasing 1.5 gigalitres of the Carnarvon region. In November, temperatures topped 40 degrees over two days.

Growers have made Spring plantings and await Summer rains to bring a renewed supply of fresh irrigation water. The Sweeter Banana Co-Operative attended the Perth Royal Show which ran in early October, and launched their Sweeter Banana Bread, giving away 6,500 samples to showgoers. The Bread is made with marked bananas unfit for sale at the market.

In the north of Western Australia, bananas are being planted and harvested in Kununurra in the Ord River irrigation area.

Banana grower AGM discusses industry sustainability

Growers members of the banana industry's peak body, the Australian Banana Growers’ Council (ABGC), have discussed banana production levels, wholesale pricing and the financial difficulties currently being experienced by many growers.

At the ABGC’s Annual General Meeting, held in South Johnstone on November 26, growers spoke about industry sustainability at the current high production levels. Also discussed were options for increasing the market for bananas.

Production levels

ABGC Chairman Doug Phillips commented on production levels, telling the meeting national banana production during the financial year’s first quarter had trended above the previous first quarter, raising the possibility that higher production could continue during the rest of the financial year.

“As a grower myself, I am keenly aware of the pressures being felt across our growing regions, particularly with regards to the record levels of supply and corresponding returns we receive for our product,” Mr Phillips said.

“Please be aware that our industry body continues to work to do everything possible to improve our outlook. In particular we look forward to the development of the industry’s new Strategic Investment Plan.

“As the peak industry body, we also continue to offer assistance and expertise with the projects that are aiming to improve our industry. A focus of our activities is encouraging investment in supply chain communications, collaboration of data and the flow of that information.

“We believe this will assist all growers with their business planning and decision making.”

Directors re-elected

Two ABGC directors, NSW-based grower Stephen Spear and north Queensland grower Steve Lizzio, were re-elected unopposed to their Board positions with the meeting congratulating both on their reappointments.

The meeting also heard that a director from either the WA or NT growing regions was still being sought to join the Board following the resignation of WA director Michael Nixon earlier this year.

Thanks to Bob Brighton

Following the meeting, a social barbecue was held at the Currajong Hotel, Wangan, (pictured above) with sponsorship for the barbecue provided by NAB Agribusiness.

Next AGM

The AGM was held at South Johnstone after being held last year for the first time in Tully. Consideration will be given to holding the next AGM in Tully.
Have your say on draft industry plan

A draft of the banana industry’s new Strategic Investment Plan (SIP) setting out levy and matched-funding investments for the next five years will be available for stakeholder comment from mid-December.

The draft is being reviewed by the Banana Industry Advisory Committee (IAC) before being made available for comment. The SIP sets out how levy investment will be directed into research and development (R&D) and marketing projects starting from the 2014/15 financial year and continuing through to 2018-19.

It is expected that about $6 million annually will be invested over this period with those funds including levies and matched funding from the Federal Government for R&D projects. No matched funding is provided for marketing which is solely levy funded.

The Plan focuses on three key areas:

- Maintaining sustainable and profitable supply – addressing plant health and other agronomic needs of the crop, biosecurity measures, new varieties, supply chain development, industry data and a number of other R&D initiatives
- Increasing demand for Australian bananas – addressing consumer and marketing research and the industry marketing plan
- Effective adoption of R&D and building industry capacity – addressing industry extension and communication, capacity building, risk planning and monitoring return on investment of levy funds.

The plan has been formulated after consultation workshops in north Queensland and northern New South Wales involving more than 45 participants and discussions with other industry stakeholders. After all input is received on the draft, a final plan will be considered by the IAC in February and will then be presented to the Horticulture Australia Limited (HAL) Board.

Further details will be provided in the December Banana Growers’ e-Bulletin and the draft plan will be available on the ABGC website www.abgc.org.au from mid-December. Comment can be provided to the Horticulture Australia Limited (HAL) Board.

The BPPP has four sub-programs covering the industry’s major areas of research and development: resistant varieties and consumer choice, safeguarding production and markets, sustainable production systems and building science and communication.

Committee guides six million dollar plan

It’s the program working to ensure the banana industry’s future – a $6 million plan that is one of the most extensive research initiatives in Australian horticulture.

Now at its mid-point, the five-year Banana Plant Protection Program (BPPP) began in September 2011 and is guided by a six-member team – the program reference committee.

Committee members are four banana growers – Cameron Mackay (Tully), Doug Phillips (Innisfail), Stephen Spear (Nambucca) and Robert Meyers (Bartle Frere), Horticulture Australia Limited (HAL) board member Ben Callaghan and Australian Banana Growers’ Council (ABGC) Research & Development Manager Jay Anderson.

Cameron, Doug and Stephen are members of the Banana Industry Advisory Committee (IAC) to HAL while Robert is a member of the IAC’s R&D subcommittee.

The BPPP has four sub-programs covering the industry’s major areas of research and development: resistant varieties and consumer choice, safeguarding production and markets, sustainable production systems and building science and communication.

Cameron chairs the program reference committee and says growers’ interest in managing pest and disease issues was one of the major drivers behind establishing the BPPP.

“It was clear from the banana industry’s strategic plan that pests and disease issues were high on growers’ agendas,” Cameron says.

“We wanted to bring together a group of people to build a strong science base to serve the industry for years to come.”

“A program approach was used to gain a critical mass and provide a co-ordinated approach to research.

“It has been a long, slow process but I believe we are now close to what we were aiming for at the start.”

It is the job of the reference committee to provide feedback to the program leadership team to ensure that the program stays on track and maintain a national focus.

The committee helps to prioritise new projects and provides information on emerging issues within the industry.

In the area of pest and disease management, there are many issues important to growers. While it can be difficult to prioritise them all, there are some stand-outs. For instance, the program reference committee has heard the industry’s views on the importance of research into the soil-borne fungal disease Panama Disease.

“TR4 trial to enter new Territory

The Northern Territory is the only Australian location where TR4 is known to be present.

The disease has devastated the banana industry there and also affects banana production in parts of south east Asia. There are also reports the disease has reached Africa and the Middle East (see report, this page).

The TR4 research in the NT is guided by the Banana Plant Protection Program (BPPP) to gain valuable information allowing a better understanding of the disease and varieties to be screened for resistance to the disease.

BPPP Sub Program Leader Dr Mike Smith said it was planned to plant Williams bananas at the Coastal Plains Research Farm, located south east of Darwin, to act as “sentinels” on the site.

“The plants will be used to test how widely and uniformly the disease is still present in the block, which is important for varietal screening trials to follow,” Dr Smith said.

Dr Smith and Program Leader Dr Andre Drenth (pictured below) have been planning the trial with Northern Territory scientists Bob Williams and Lucy Tran-Nguyen.

Panama reaches Africa

The first detections of Panama Tropical Race 4 in Africa and the Middle East have been reported.

They are the first reports of TR4 outside of the south east Asian region. In December it was reported TR4 had been found on a commercial farm in northern Mozambique earlier in the year. A consortium of agriculture and government groups have been mobilised to address the outbreak and raise awareness throughout Africa.

The follow-up release in November of a journal Plant Disease said TR4 had been identified in Jordan and could affect up to 80 per cent of bananas in the Jordan Valley region where there is up to 1500 hectares of production.
Taking control
an inside look at eradication HQ

I'm wearing a bright green reflective vest emblazoned with the words “Communications Manager” as I enter the house-sized Biosecurity and Product Integrity Group building. Inside it’s a hive of activity.

Several people work at desks and tables in a large room, its white walls covered in maps, charts, and schedules. To one side, a man wears a vest similar to mine, though it’s red and reads “Investigations Manager.”

Smaller rooms throughout the building are labelled “Controller,” “Biosert,” and “Teleconference in Progress.” Notes are jotted on whiteboards. Landlines and mobiles ring. Photocopiers whir. A woman wearing a bright blue vest that reads “Logistics Manager” is focussed on a computer screen, her fingers flying across the keyboard as she works to secure and track the resources and services needed to keep this effort possible.

There is a lot to do. Welcome to the National Banana Freckle Eradication Program local control centre at the NT Department of Primary Industry and Fisheries (DPIF) campus at Berrimah. Farm on Darwin’s southern outskirts.

Since the attractively-named Phylosticta cavendishii was confirmed on Cavendish bananas in the NT in August, DPIF staff from across the NT, biosecurity experts from interstate, and contractors have worked on the Banana Freckle response. It is a full-time effort, including evenings and weekends, seven days a week. It involves the eradication of all bananas within a one kilometre radius of infected properties. So far, up until late November, they’ve identified 14 infected properties and conducted surveillance on more than 3,000 properties.

P. cavendishii is a major concern because this is the first time it’s been confirmed in the Northern Territory on Cavendish, Australia’s main commercial variety. If Banana Freckle spreads beyond the Territory, it could have a significant negative impact on Australia’s $500 million banana industry.

Over in the control centre’s DD&D area (destruction, disposal, and decontamination), a DPIF staff member located from the business development area has brought her communication and organisation skills to the team. On the wall beside her computer is an impressively-detailed, colour-coded flow chart which clearly identifies the many steps in the eradication process.

In another wing of the building, the Banana Freckle Hotline is ringing. “We received over 275 calls in November,” says an operator who is entering details into a computer. “I open a new file for each new caller, 40 per cent of whom don’t have bananas, but they’re ringing us because they’ve seen surveillance note on their gate. I let them know we need to check anyway. “A small number of people don’t want to enter their property, but most accept that we have an important job to do. My last caller was rather chatty, telling me about the fabulous holiday he’d just had in the Philippines. He was happy for us to check out his property when he’s back.”

The Planning Manager is wearing a yellow vest and is a Victorian biosecurity professional who is assisting our team. “This work is highly structured,” she says. “Part of my job is to ensure that there’s no loss of accountability, all roles are clear, and nothing is overlooked. We also keep tight reins on where the money is being spent, and what it’s being spent on. Having a good outcome is our focus.”

I peer out the window of the air-conditioned control centre. It’s hot and sticky out there today, 33 degrees with 64 per cent humidity.

I think about the rest of our team—dozens of surveillance and eradication staff, and contractors. They’re fanning out across Darwin and the rural area, talking to residents, checking properties, swinging machetes, hauling heavy banana trees in the heat. It’s hard yakka.

I’m grateful they’re on the front lines, helping us to control this pest that threatens the livelihoods of so many people. It’s been said before, and it’s worth repeating, “If you’re going to do a thing, do it properly.” Thankfully that’s exactly what has been happening here.

Freckle eradication to enter new phase

Next steps are being considered in the plan to eradicate the serious fungal disease Banana Freckle (Phylosticta cavendishii) from the Northern Territory.

At time of writing, eradication work on freckle, which is carried in wet spores, had continued through the start of the wet season in November and the rains brought by tropical cyclone Alesia towards the end of that month.

The work is included in the first phase of a Banana Freckle Response Plan, drawn up by the Northern Territory Department of Primary Industry and Fisheries (DPIF) and endorsed by a National Management Group (NMG) comprising government and industry representatives.

The NMG and a Consultative Committee on Emergency Plant Pests (CCEPP), which also has government and industry representatives as members, are considering the next actions required.

The outbreak, first announced in August, is the first major find in Australia of freckle on Cavendish bananas. The disease rates as among the worst affecting bananas, along with others such as black Sigatoka. It poses a serious threat to Australia’s $500 million banana industry.

By the start of December, freckle findings had been announced for 14 infected properties in four areas of the NT and surveillance was continuing.

The disease was initially located on two properties in the Howard Springs area, about 30 kilometres south east of Darwin. It was later found in the Batchelor and nearby Rum Jungle areas, about 60 kilometres further south. The November findings were at Humpty Doo and Acacia Hills, located between Howard Springs and the Batchelor and Rum Jungle areas.

Most finds have been in backyard bananas of rural residential properties but eradication and surveillance efforts have included a small commercial plantation at Rum Jungle. The disease has not been reported in major Northern Territory commercial production.

The cost of the eradication, funded jointly by governments and industry, was initially estimated at $2.8 million, including a contribution of about $500,000 from the banana industry.

Further announcements are expected on cost estimates and the banana industry’s funding of its contribution. It is the first banana industry response under the Emergency Plant Pest Response Deed (EPPRD).

The Australian Banana Growers’ Council (ABGC) began working with government as part of the CCEPP response which began when an infection was first suspected in July.

After a decision to eradicate was announced on October 4, ABGC Chief Executive Officer Jim Pekin travelled to the Northern Territory to attend public meetings in communities where freckle-affected banana plants and fruit had been found.

Freckle is a fungal disease that covers banana plant leaves and fruit with raised black blisters that have the texture of sandpaper. The fruit is safe to eat but the disease reduces plant yield and the fruit is unsaleable due to its appearance.

Eradication activities have included quarantining infected properties, cutting down and removing banana plants and fruit from designated zones and continuing surveillance work.

More on Banana Freckle – Secrets in the sequences, Page 12.

Above: Banana plants are eradicated at a small commercial plantation at Rum Jungle, NT. Below: Eradicated plants are transported in covered loads for burial in trenches in disposal areas.
Secrets in the sequences

For more than eight years, researchers in Australia have worked to unlock the secrets of banana Freckle. Now, just in time, the painstaking work has been used to help fight our first major incursion to hit Cavendish. The Banana Plant Protection Program’s Research Fellow for Banana Diagnostics Dr Juliane Henderson reports.

Banana Freckle’s symptoms are plain to see in the field - raised brownish-black spots with a sandpaper feel. Yet in the lab, where the analysis goes much deeper, it has taken painstaking research to begin to unlock the disease’s many secrets.

While the first major incidence of Banana Freckle on Cavendish in Australia was found in the Northern Territory in July, the work that has been helping to fight the incursion began in 2005. And it was only last year that a four-year PhD project made the breakthrough discovery of a previously unknown freckle-causing fungi.

Unique and mysterious Freckle is a unique and mysterious banana plant disease. It is the only fungal disease found to infect both banana leaves and fruit. While infected fruit remains perfectly edible, its unsightly appearance can drastically reduce its marketability.

On the list of damaging banana diseases, Banana Freckle ranks as one of the world’s worst. It is now a major constraint to production in south and south-east Asia. In Taiwan, it is considered more serious than black Sigatoka. Studies from the Philippines have shown that without adequate fungicide control, almost 60 per cent of fruit can be rejected.

The disease’s symptomatic sandpaper spots may be discrete, or aggregate to form circular or streaking lesions along leaf veins where water has carried the spores. On the fruit, the spots are surrounded by dark green, water-soaked halos and, in severe infections, these spots may entirely cover the fruit at harvest.

The effect on the cosmetic value of the crop is significant. Bunch yields can also suffer due to loss of leaf area through defoliation from severe infection or from control by de-leafing.

Timeline

2005 Australian research begins on pathogen samples. Work is on endemic isolates gathered in Australia or on DNA extracted from imported and irradiated overseas specimens

2008 Pathogen cultured in Montpellier, France, from Malaysian samples and imported to Australia as sterile DNA

2009 The collection of samples is large enough to commence PhD student MeeHua Wong’s work on Banana Freckle. Isolates studied from around the world

2012 Additional research conducted in the Netherlands on south-east Asian samples. MeeHua identifies a third Banana Freckle fungus and develops a diagnostic tool

2013 MeeHua returns to Malaysia. Her research and diagnostic tool are used in the NT Banana Freckle incursion.

Below: The formation of Banana Freckle leaf spots can be seen in this view through a stereo microscope. Bottom: Freckle as it appears on an uncut bunch.

Spotting the difference

While Banana Freckle is easily identifiable in the field, it is the host range of the pathogen which has long been a source of mystery to banana pathologists.

Disease records and field observations spanning decades had led to the hypothesis that two types of Banana Freckle existed.

One type of freckle was thought to occur throughout south and south-east Asia infecting both Cavendish and non-Cavendish varieties. A second type, seen throughout Australasia and the South Pacific, appeared to only infect AAB/ABB varieties. This second type was often found on AAB/ABB varieties growing nearby, but not infecting Cavendish plants. From this anecdotal evidence, the theory of two fungal strains or species.

However, until very recently, it was difficult to test this hypothesis. The pathogen, originally known as Guignardia musae, was not keen to give up its secrets.

Isolation of the pathogen from infected bananas is incredibly difficult and, when successful, takes up to three months to grow in the laboratory. Even more challenging is coaxing the pathogen to produce the spores in culture which are needed for study, even though the pathogen readily does this in the field.

Despite these challenges, solving the mystery had significant consequences for the Australian banana industry. Only the non-Cavendish infecting type is present in parts of Australia and, even then, incidence is extremely low.

Incursion by the exotic, Cavendish-infecting variety of Banana Freckle has the potential to devastate the industry. Overseas, weekly applications of mancozeb or other fungicides are necessary to produce marketable fruit. With the Cavendish-infecting variety known to also infect AAB and ABB varieties, a method to differentiate the exotic and endemic Banana Freckle types is needed.

The mystery unravels

Our study of Banana Freckle began in 2005 with the collection of samples. In Australia we could only culture endemic isolates or extract the DNA from overseas leaf specimens which had been first killed using gamma irradiation.

Much of this early work was assisted by Sharon van Brunschot, who sought off-shore contacts and isolated the pathogen from samples collected in Australia. In 2008, during a Sigatoka science exchange in Montpellier, France, I and Kathy Grice took the opportunity to culture the pathogen off-shore from samples collected in Malaysia. These samples were grown in France before being imported back into Australia as sterile DNA. As our collection grew, the opportunity arose to commence a PhD student working on Banana Freckle.

Ms MeeHua Wong joined us from the Department of Agriculture in Sarawak, Malaysia, in mid-2009. Charged with the task of solving the host range mystery of Banana Freckle, MeeHua worked diligently on a project she never anticipated would be as difficult as it was. Working 12 hours a day, six to seven days a week, MeeHua’s determination and dedication became our secret weapon against Banana Freckle.

However, the mystery only really began to unravel after a four-month study tour to the Netherlands to work with Professor Pedro Crous, an expert in fungal taxonomy. In the Netherlands, MeeHua was able to study Freckle disease specimens collected throughout south-east Asia under expert guidance.

This study tour would not have been possible without the aid of a Mort Johnston Professional Development Scholarship awarded to MeeHua in 2009. The scholarship panel recognised the importance of this work and the outcomes of the study opened the doors to our understanding and helped us prepare for the current Banana Freckle eradication campaign in the Northern Territory.

"Research carried out so far is an excellent example of how research is fundamental to preparedness for pathogen incursions."
The secret’s out
For four years, Malaysian PhD student MeeHua Wong worked to unlock the secrets of Banana Freckle. In work assisted by funding from the Australian industry’s Mort Johnston Development Scholarship, MeeHua developed a diagnostic tool now being used in the NT.

She found there were actually three types of fungi, not two, causing the disease. *Phyllosticta maculata* – commonly found in Australia and the South Pacific on AAB and ABB varieties. *Phyllosticta caven-dishii* has been identified as the species capable of infecting Cavendish as well as non-Cavendish varieties. It is this species which is currently being eradicated on Cavendish in the Northern Territory. A third species, *Phyllosticta musaram*, which does not occur in Australia, causes Freckle disease on AAB and ABB varieties and has so far been found only in Thailand and India.

Outcomes from MeeHua’s study have been published in three internationally recognised journals and are already proving valuable in the Northern Territory disease eradication. DNA sequences as well as a DNA diagnostic tool which differentiates the species are being used to identify the pathogens on samples collected around the world, we now know that three species of fungi cause Banana Freckle.

**Phyllosticta maculata** is the name given to the species commonly found in Australia and the South Pacific on AAB and ABB varieties. *Phyllosticta caven-dishii* has been identified as the species capable of infecting Cavendish as well as non-Cavendish varieties. It is this species which is currently being eradicated on Cavendish in the Northern Territory. A third species, *Phyllosticta musaram*, which does not occur in Australia, causes Freckle disease on AAB and ABB varieties and has so far been found only in Thailand and India.

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**More to do**

The opportunity for overseas study, made possible by the Mort Johnston Professional Development Scholarship, was integral to unlocking some of Banana Freckle disease’s greatest secrets. However, there are still many unknowns about the disease. It is possible that within each species, races exist, not unlike those in Fusarium wilt. A better understanding of how the disease spreads in the field is also needed to assist in future eradication strategies.

Hopefully, future work can unlock more secrets of this devastating disease. The Banana Freckle investigations carried out so far as part of the industry’s Banana Plant Protection Program (BPPP) are an excellent example of how research is fundamental to preparedness for pathogen incursions through collaboration, determination and industry support.

**Meet Juliane Henderson**

Juliane’s work helped eradicate a black Sigatoka outbreak and her current research includes Banana Freckle. In our continuing series on banana scientists, meet Juliane, a Research Fellow (Banana Diagnostics) for the Queensland Alliance for Agriculture and Food Innovation (QAAFI).

Tell us what got you interested in the banana industry?

In a way, the banana industry found me. In 2000, I was finishing up a research project with the sugar industry when I was shown a project proposal written by Ron Peterson. Ron wanted to improve the molecular diagnostics for black Sigatoka. I accepted the project and some six months later found myself in the midst of the Tully eradication. I’m fortunate that the industry have wanted to keep me since.

Where did you do your training, both academically and in the field?

In Grade 6 I took my microscope to school and spent hours showing my friends the mysteries of magnification. Not surprisingly, I ended up studying microbiology and biochemistry at QUT/QUT in Brisbane. Plant pathology wasn’t on my radar until I was offered a post-graduate virology project in James Dole’s lab. I hold Marion Batesen, my postgraduate supervisor and mentor, personally responsible for my love of molecular plant pathology while Don Maclean (UQ Biochemistry) turned me into the diagnostician I am today. I am still learning every day from everyone I interact with. I have spent more time in the field overseas than in Australia because that is where the diseases are, but if anyone would like to invite me to their farms, I promise to clean my shoes first!

Tell us what happens on a good day in banana research? And on a not-so-good day?

On a good day in banana research, experiments work as planned, students are enthusiastic and obstacles are few. On a really good day, experts do not even better than hoped. Not-so-good days happen when experiments unexpectedly fail, or regulatory and bureaucratic hurdles get in the way of progress.

How does your work help the industry and tell us about a breakthrough moment you’ve had on a project?

My team develops DNA-based tools to quickly identify exotic fungal and bacterial diseases. Fast and accurate disease diagnosis is essential when you have a potential quarantine threat banging on your door. A current example is Banana Freckle - diagnostics developed by us are being used for species identification in the Northern Territory.

One of my favourite breakthrough moments happened during the 2001 Tully black Sigatoka incursion. The published DNA test to distinguish yellow and black Sigatoka wasn’t working, so we were left with only one choice - to develop a new test on the run. After a long and frustrating day in the lab, Julie Patterson and I sat down on the veranda of the Mareeba Motor Inn to do the new design. We were armed with Sigatoka DNA sequences, a calculator and a mud-strength stubbie each. The assay worked and the DNA primers were affectionately known from then on as the ‘Carlton Mid-Strength Primers’.

What’s one of your favourite things about working in the banana industry?

The banana industry takes a very proactive approach to disease prevention and preparedness. It’s nice to feel our work is valued and that we are truly a part of the industry.

Juliane and daughter Teigge test the waters on a yabbeying expedition.
Lessons from the Philippines

An Australian banana industry contingent has visited plantations in the Philippines as part of an international workshop on Panama Disease Tropical Race 4 (TR4) and warned Australian growers not to be complacent.

The four-member contingent of three scientists and a north Queensland grower visited the Philippines in mid-November for the three-day workshop to discuss TR4, also known as Fusarium wilt.

Tully grower Patrick Leahy was among the group and said visits to field trials on the workshop’s final day left him “shocked” when he witnessed the impact of the soil-borne fungal disease. Another member of the group, Queensland Department of Agriculture, Fisheries and Forestry (QDAFF) Principal Nematologist Tony Pattison, said the Philippines’ experience held many lessons for the Australian banana industry. TR4 is widespread in banana-growing regions in the Philippines but in Australia has been located only in the Northern Territory.

“At the top of the list is – don’t believe it cannot happen here,” Dr Pattison said.

Other members of the group attending the workshop were Australian Banana Growers’ Council (ABGC) Research and Development Manager Jay Anderson and QDAFF Senior Development Horticulturist Stewart Lindsay.

The workshop held two days of presentations on the Fusarium situation in each country, the economic impact of the disease and current research into management of the disease. After the presentations, the whole group developed actions to progress in the areas of R&D, policy and institutional arrangements.

On the final day there was a visit to a box factory, tissue culture laboratory and to the field trials being conducted to assess tolerant varieties. At the trials, there was the opportunity to see the severity of the effects of the disease.

For Patrick Leahy this was a significant part of the tour. “The severity of the disease at this farm and the one next door shocked me badly,” he said.

“I termed it as the killing fields with all susceptible varieties plants going down and the only healthy plants being among the 219 trial plants, although some of these trial plants had also died. This disease is something I never want to see in the north Queensland growing area” – Patrick Leahy

For Dr Pattison and Stewart Lindsay, “A regional Asian approach to managing the disease allows us to draw together experiences and strategies from the different countries to limit the spread and reduce the damage caused by Fusarium wilt,” Dr Pattison said.

For Dr Pattison and Stewart Lindsay, the Philippines workshop follows other international research conducted when they attended the International Banana Symposium in Taiwan last year.

The consultation workshop examined the socio-economic impacts of Fusarium wilt disease of Cavendish banana in the Asia-Pacific region. It was also attended by researchers, growers, government agencies and private-sector representatives from the Philippines, Taiwan, China, Indonesia, Malaysia and Vietnam.

Dr Anderson said the workshop was able to go ahead as scheduled in Davao City, located about 400 kilometres south of the areas worst affected by Haiyan.

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Tweed district celebrates bananas

The Tweed district in northern New South Wales has celebrated two events showcasing the banana industry - November's Murwillumbah Show and August's Tweed Valley Banana Festival.

The show featured an impressive display of local produce with Eungella grower Will Everest named as most successful exhibitor and other section winners including M & J Hesse, the Atwal Brothers and A & S Everest. One of Australia’s longest-running annual celebrations, the 58th Tweed Valley Banana Festival, was held in August. Thousands turned out on the streets of Murwillumbah for a parade led by festival queen Jessica Mattner and event mascot Banana Jim.

Growers gather for Tully weigh-in

Kennedy District’s Jeff Dickinson took out two major awards at July’s Tully Show.

Jeff was named Most Successful Exhibitor and won the Steward’s Choice award after winning exhibit sections for Heaviest Plant Bunch, Champion Pair of Ratoon Bunches, Best Three Clusters and Open Heaviest Plant Bunch.

Di Carlo Bananas was the second Most Successful Exhibitor with wins including Champion Bunch. Sellars Bananas won the Champion Plant Bunch and had the Tully District’s Champion Cluster Carton Extra Large. Other section winners included MacKay’s South Davidson and Bolinda Estates and the Flegler Group.

Photos taken at the banana exhibit weigh-in are provided courtesy of The Tweed Times.

The Atwal Brothers from Dumbible took the prize for heaviest Cavendish bunch with this 56.5kg entry.

Outgoing Tweed Valley Banana Festival Queen Jessica Mattner leads the street parade aboard a bunch-laden tractor.

Picking winners: Judging bunches at Tully are Queensland Department of Agriculture, Fisheries and Forestry (QDAFF) Senior Development Horticulturist Stewart Lindsay (left) and wholesaler Greg Braddihaw from exhibit sponsor P W Chew & Co.

Festival mascot Banana Jim hits the streets of Murwillumbah on the festival’s leading float, accompanied by quest winners.

The Atwal Brothers from Dunbible was the show’s most successful exhibitor. Pictured is his Lady Finger hand – the Champion hand of the show.

The Atwal Brothers from Dunbible took the prize for heaviest Cavendish bunch with this 16.5kg entry.

Unwrapped: Tully grower Paul Johnston (blue shirt) unloads bananas for the weigh-in.

At the weigh-in: Irene Russell, Dennis Lindsay, Michael Lindsay (front) and Fabien Tauli.

Bianca and Michael La Spina at the Tully weigh-in with French backpacker Sebastian Pitoizet (right).

At the banana exhibit weigh-in (from left) are Steve Morrice, Barry Barnes and Gavin MacKay.

Bananas took pride of place in an impressive display of produce at the Murwillumbah Show.
CAMPAIGN PUTS A SMILE on retailers’ faces

Since its launch in 2012, the Australian Bananas “long-lasting energy snack” marketing campaign has proven to be a major hit with consumers. But how effective has it been in winning over our leading retailers?

It’s been an exciting year for Australian Bananas. Not only has our marketing campaign and its key message of “long-lasting energy” continued to resonate with Australian consumers, we’ve also been busy working with Australia’s leading retailers to ensure Australian Bananas are always top of mind at shopping time.

And now that investment in our retail presence is beginning to show some strong returns. By working closely with all our retail partners, we’ve been able to drive awareness, provide consumer education, and ultimately lift sales and consumption of Australian Bananas.

Central to our activity has been the consistent use of our highly successful and recognizable “No-No Na-Na” theme plus other key advertising messages.

This has meant consumers have had no difficulty in linking our mainstream advertising to any retail messaging, either in-store, online, on TV or in catalogue.

Working in partnership with IGA, we created an eight-week integrated marketing campaign designed to put Australian Bananas front and centre in their top 1300 stores. Highly visible bin card point of sale posters were supported with advertisements in the IGA Today magazine along with recipe panels and banners in print and online catalogues. This activity allowed IGA to highlight bananas without the sole reliance on price, whilst simultaneously incentivising stores by running a national ‘display’ and sales competition.

The results have been impressive and IGA’s Luke Couch is understandably delighted.

“IGA has worked extremely closely with Australian Bananas over the last 3 years and the results during the promotions have always far exceeded expectations for volume and sales to the point that our Australian Bananas promotion has become an integral part of IGA’s Fresh Produce marketing calendar.”

Luke Couch National Buying and Merchandise Manager – Fresh Produce, IGA

“Woolworths, Australia’s Number 1 Retailer and Number 1 Fruit and Vegetable supplier, is another to benefit by working closely with us. By linking Woolies bananas activity to the Australian Bananas marketing program, we have been able to take advantage of their significant marketing and advertising spend and successfully complete the consumer’s path to purchase.

“The opportunity for Woolies to link in with the Banana Industry’s marketing program provided a great platform for Woolies to engage and educate the consumer. This then enabled Woolies to drive the path to purchase through many media channels both internally and externally.”

Donald Keith Senior Category Manager Fruit & Floral, Woolworths

Meanwhile, our “longer lasting energy” campaign shows no sign of running out of legs.

A major advertising burst in October and November was planned to coincide with our retailer activity. This two-pronged approach timed perfectly to support higher than expected production during this time.

The main media campaign will return in February and March 2014. Media will continue to extend from television and radio through to bus-side billboards, in-store, online, on TV or in catalogue.

“AN AUSSIE FIRST!”

It’s a similar story at Aldi, where we secured exclusive bin-wrapping point of sale posters across all 317 stores during October and November. This enabled us to leverage key advertising messages from our TV and radio campaign which was airing at the same time. Using point of sale posters in this way was a first for Aldi in Australia.

“AUSTRALIA’S TOP 300 GREEN GROCERS”

And just to make sure we were covering the full range of retailers, we sent merchandising teams to Australia’s top 300 Green Grocers to kit them out with point of sale posters and educational brochures to further reinforce the benefits of eating Australian Bananas, especially Lady Fingers.

FASEBOOK PAGE

“IGA has worked extremely closely with Australian Bananas over the last 3 years and the results during the promotions have always far exceeded expectations for volume and sales to the point that our Australian Bananas promotion has become an integral part of IGA’s Fresh Produce marketing calendar.”

Luke Couch National Buying and Merchandise Manager – Fresh Produce, IGA

The Australian Bananas Facebook page now has over 197,000 fans and has reached over 7.3 million Australians since July 2013 alone! This combination of a strong, single-minded advertising message, coupled with a highly integrated retail push, means that hopes are high for continued healthy sales of Australian Bananas in 2014.
Tour highlights threats, opportunities

A study tour to China and the Philippines has given members of Australia's banana industry insights into major biosecurity issues as well as different approaches to foster development, fruit handling and transport.

The 10-day September tour gave the group of growers and nurserymen a first-hand look at major biosecurity issues for global banana production. They saw the effects of Panama Disease Tropical Race 4 (TR4), Moko disease and black Sigatoka and the extra efforts required to manage these diseases. Seeing a plantation in Hainan Island which has been abandoned due to TR4 had a big effect on tour participants. They have returned with a resolve to work on their own on-farm biosecurity but have also requested ongoing commitment by all involved in the banana industry – growers, industry leadership, ABGC, industry partners, researchers and State and Federal governments.

In China, study tour participants were fascinated with the development of various organic fertilisers and the high-tech fertigation delivery systems. Organic fertiliser made from the by-products of tapioca and ethanol manufacture mixed with mill ash is made by the Jin Sui Agricultural company and used by the many smaller growers who grow for the company. The attention to quality in the Philippines was impressive. Quality control was high in the manufacture of cartons and plastics for use in the industry. Fruit was handled with care from the early stages when plastic sheets were used between hands to prevent rub, right through to the refrigerated storage used for fruit prior to loading at the wharves. The visit to Asia Fruit Logistica in Hong Kong demonstrated to the group that other Australian horticultural commodities have achieved a high level of representation on the world stage. Study tour participants saw the latest innovations in transport, handling and marketing fruit and vegetables. The visit generated discussion amongst tour participants – in Australia we are in a prime position to supply produce to all of Asia but we cannot compete with other countries where there are significantly lower cost of production; we need to differentiate ourselves based on quality or look for savings through mechanisation.

Our thanks
The study tour was a valuable experience not only for the participants but for others in the industry who will share in the knowledge gained. The tour group acknowledges the work of Marc Jackson in organising a fantastic itinerary. Simon Zhang is thanked for the excellent Philippines itinerary. Andrew Serra, grower, Tolga is thanked for the excellent Hong Kong itinerary. The tour group is grateful for the work of Marc Jackson in assisting with the organisation of the tour and for Simon Zhang, the tour’s manager.

Our thanks
There were opportunities to share ideas with other growers and nurserymen and the participants were impressed with the quality of the produce in Hong Kong and the general standard of presentation and quality control in China.

Tour diary
- Sept 4th & 5th: Hong Kong, China – visited Asia Fruit Logistica Expo
- 6th: Nanning, Guangxi Province, China – visits to farms, a market place and fertiliser plant
- 7th: Nanning, China – farm visits
- 8th & 9th: Sonya, Hainan Island, China – visits to farm, trial site and tissue culture laboratory
- 10th to 12th: Travel to Davao, the Philippines – visits to box factory, plastics factory and nursery. Farm and packing shed visits, what visit to see export fruit loaded onto ships.
- 13th – return to Australia

Highlights
- Demonstrated to Australian growers that we can’t take our good disease status for granted
- Seeing the use of organic fertilisers and automated fertigation systems in China
- A whole-of-chain look at banana growing in the Philippines, from growing to transport to the wharf for export, and the focus on quality

What happened on tour hasn’t stayed on tour

Participants have been speaking with other growers about the trip. Here’s a snapshot of some of the thoughts and ideas from study tour members:

Paul Inderbitzin, grower, Lakeland
“Since the trip through China I have gained a great appreciation for quarantine. Inductions now include a few basic rules framed around quarantine and biosecurity to highlight its importance to the new team members.

“When we recruit new staff we ask where they have been and if necessary supply new footwear. Foot baths and vehicle wash bays are being considered in our business plan to be implemented in critical control points.”

Craig Althaus, nurseryman, Tully
“I’m planning upgraded quarantine measures at the nursery, including restricted access to production areas, vehicle and foot-sterilising baths and signage.

“Other measures include resurfacing the nursery surrounds, changing two greenhouse floor surfaces and traling certified potting mixes from southern suppliers to eliminate the need to have potting mix stored in bays and exposed to contamination.

“The racks we use to transport plants to other farms have been stripped and repainted to allow improved sterilisation prior to them being reused. The tour also reinforced the importance and the effectiveness of the existing QBAN (Quality Banana Approved Nursery) system and I am now better able to promote the scheme with the growers I supply.”

Darryl App, grower, Mission Beach
“Fertiliser is the big thing we are looking at. We are setting up tanks in the irrigation shed so it can auto feed with the water irrigation pump.”

Stephen MacKay, grower, Tully
“The study tour reinforced my thoughts on why the industry needs a stronghold on all quarantine issues, especially the fact of our island status. We should also be very aware of not introducing anything accidentally and it is just important that your own farm quarantine is part of the solution of not getting these incursions.”

Welwei Cui, shed supervisor, Mareeba
“It’s important to keep diseases out of our bananas. All necessary quarantine measures need to be put into action.”

Andrew Serra, grower, Tolga
“We have now put a section in our induction that asks workers if they have worked on farms in the Northern Territory or on any farms in China. A whole of chain look at biosecurity is important.”

Members of the study tour present some Australian Bananas merchandise to their hosts in China.
other banana farms around the world. If they have, then we request that they thoroughly clean their vehicles before entering the farm then we inspect them for any visible dirt. We will also sterilize their boots before they commence work.

“As a business we are also looking at closing off losing off all vehicle access points to our farm and placing a vehicle wheel wash at the main entrance and having a designated visitor parking area with a boot wash facility that they must pass through before entering the farm.”

Aiden Mockay, grower, Tully

“My knowledge and awareness of the quarantine and hygiene measures needed to keep diseases away from the industry has greatly increased. I have also learned a lot on the study tour about how to control these diseases if they were ever to arise.

“We started to implement different practices throughout our business and will try to share this information with the rest of the industry. I am extremely grateful for the opportunity to attend the study tour and believe that I have benefited greatly from it.”

Ben Franklin, General Manager – Banana Category, Costa Exchange, Tully

“While I believe our business has a good working knowledge of disease (and control measures), to be able to see the challenges other countries face with devastating disease outbreaks brings home the importance of this message.

“Having taken several photos and videos of the trip it has been great to be able to share these internally within our business and to other growers to assist with the creation of more robust policies and procedures and promote adherence to these in order to minimise the impact of disease outbreaks.

“It was also invaluable to see the amount of work being carried out on new varietal development with an emphasis on disease tolerance/resistance. It is critical that the ABGC continues to work on these matters with growers and other stakeholders in an open and transparent manner for the good of the whole industry.”

Dr Pulipiyapporambil Josekutty, Tissue Culture Lab Manager, Clonal Solutions, Wellington

“I have been encouraging banana farmers to use disease-free tissue culture plants to improve their farming prospects but from now on I will advise them to use only disease-free tissue cultured banana for replanting and extending planting to new areas.”

Shannon Paton, grower, Palmerston

“We have been doing some study into the beneficial fungi and bacteria created from animal manure – certain animals have only beneficial bacteria and fungi (pathogens) and others have nasties that could turn the underground food chain in their favour. We are in the process of trying to multiply them to improve the health in the soil.

“We are going back to the basics in farm practices - less visits to the bunch to utilise time more efficiently, including our team and involving them in each process, allowing them to have a better understanding of why each practice we do is important to achieving a good product.”

James Howe, grower, Mareeba

“I gained a great appreciation for how much of a precious asset our farms are in FNQ and I certainly see a more significant benefit in preserving our disease free land.

“Seeing the Asian farmers battle with Panama Disease, Moko, Black Sigatoka etcetera and some of the actions they’ve resorted to in managing it, has made me aware of how much is at stake with regards to our industry and livelihood.

“I am grateful to have attended the China-Philippines Study Tour and am more knowledgeable for having done so.”

Next-generation growers

We continue our series on the new generation of banana growers with a profile on subtropical grower Duane Pierce who answered our 10 questions.

Duane is 26 years of age and has been farming with his father, Geoff, on a steep property at Glengarrie, just south of the Queensland-New South Wales border. Geoff and Duane farm six to seven hectares of Lady Fingers, two hectares of Cavendish and some Goldfingers. Duane will be taking over the running of the farm on a solo basis in the New Year.

How long has your family been in the business of growing bananas?

I am the fourth generation – my great grandfather began farming bananas back in the 1930s.

Did you come straight from school to begin work on the farm? Did you work on the farm while still at school?

During school holidays I worked on the farm and after school did one year in the landscaping business but decided to come back and work full-time on the farm. It is nearly 10 years now that I have been here.

What do you like about farming bananas?

I love the outdoors, the peace and quiet and it helps keep me fit.

What don’t you like about it?

Working in the rain on steep slopes, the extremes of weather and the paperwork side of the farm.

What are your other interests apart from farming bananas?

I love surfing and fishing and constructing things - I’m always building something!

What do you see for your future in the banana industry?

I will be taking over the running of the farm in the New Year when my father, Geoff, retires from full-time farm work so I have been training a new worker to do the things I have been doing.

I do see a future, but it is in supplying direct to retailers. We have just extended our packing shed and have built two ripening rooms which started operations in late November. Having the ripening rooms means we will have more options for selling directly into the retail market.

We are already selling direct into farmers’ markets at Palm Beach and Currimbong and I am also selling to a retailer with four fruit shops who can take all the bananas I can supply.

A great thing about the area where we are growing is there is strong consumer interest in locally-produced food. This November I participated in the Tweed Foodie Fest – a great event for promoting the range of quality produce in the region.

What do you see for the future of the industry?

The risk of imports is still around, but for subtropical growers, we need to market direct if we are to survive.

What would you like to see happening in the banana industry?

We need to keep up the research to help growers and there is always room for new ideas.

Are you looking at introducing new or different methods to your farm practices?

We have built our two new ripening rooms – one for Cav and one for Lady Fingers – and that has been a really important achievement for us as it will open up a lot more options for selling our product.

I will progressively be adding another five acres to Cav production – I’m planning to plant out an additional acre each year for the next five years. I am also currently looking at new ideas for props.
Seven survivors set for new trials

Seven of 13 banana varieties grown in an 18-month field trial testing for disease resistance will advance to new commercial production trials. The seven, a mix of local and international varieties, scored promising results for resistance to the soil-borne fungal disease Panama Race 1. The field trial was held in Duranbah in northern New South Wales and is part of the banana industry’s Banana Plant Protection Program (BPPP). The BPPP is also running separate trials at South Johnstone in north Queensland and also has trial plans for Ayr in north Queensland’s dry tropics and Darwin in the Northern Territory.

At the killing fields

About 35 subtropical growers attended an October field day at Duranbah to see the 13 new varieties and taste test the fruit. The block is a race 1-infected site where bananas were grown more than 20 years ago. It is now colloquially known as the “killing fields”. The trial screened new varieties, as well as local selections of established varieties, against race 1 with an ambition to find new resistant banana varieties with potential for the Australian banana industry. Developing new disease resistant varieties down the track will ultimately mean Australian consumers will have more choice.

Included in the trial were imported varieties from international breeding programs from as far afield as Taiwan, Honduras and Cuba. The resistance trials were conducted under the auspices of the Banana Plant Protection Program’s (BPPP) Resistant Varieties and Consumer Choice subprogram led by Mike Smith, Senior Principal Scientist of Queensland’s Department of Agriculture, Fisheries and Forestry (QDAFF). The trial manager was David Peasley who is part of the program’s leadership team (subtropical).

Dr Smith said it was important to identify disease-resistant varieties.

“ Whilst the industry recognises the threats that exist from Panama Disease, you need to tackle the problem from a number of fronts. One approach is through resistant varieties that show good performance under a range of Australian environmental conditions,” Dr Smith said.

“We need resistant varieties which show good performance under a range of conditions so that the geographic area for banana production improves our resilience against the impact of cyclones.

“We also want to give consumers a greater choice of banana varieties which will increase the demand for bananas.”

New commercial trials

Although it is still early days, seven of the 13 varieties tested were chosen to go forward to commercial trials that will run for the next two to three years. They are: FLF-1, SC-1 and FC-1 (three local selections), as well as varieties from overseas breeding programs and collections - High Noon, Hom Thong Mokha, Fa’i Palagi, and Pisang Ceylan.

Walking the field of dreams

For growers looking for disease-resistant and niche varieties, the Duranbah field trial holds exciting possibilities.

Growers attending the field day had the opportunity to see plants growing in Panama-infected conditions and to taste bananas grown on the block. Those attending came from the local Tweed and Brunswick districts as well as from the mid north coast districts of Coffs Harbour and Woolgoolga.

“I think it’s a good trial. There’s some promising varieties there for sure but it’s a little bit early to tell whether they’re going to be successful, we’ve just got to wait and see.” – Tweed Brunswick Banana Growers’ Association President Robert Fierce.

“I was impressed with the trial. I honestly thought there would have been more Panama disease showing up. There was some nice fruit. There’s good potential for the growers who want to try some of these varieties that have a different taste.” – Ron Gray, Coffs Harbour and District Banana Growers’ Association Vice President

“The field days needs to happen more often so there’s a greater understanding and people know where we’re at with disease. We haven’t got Panama around Coffs Harbour so it was good to be able to see it first hand and to actually taste the bananas grown.” – Josh Tate, grower, Coffs Harbour.

“I was surprised. I don’t think there would have been more Panama disease showing up. There was some nice fruit. There’s good potential for the growers who want to try some of these varieties that have a different taste.” – Josh Tate, grower, Coffs Harbour.
Hunter Tablelands-based Clonal Solutions Australia is the increasing interest from crop farmers in tissue culture technology. But an emerging trend seen by Bananas in demand Clonal Solutions’ Tissue Culture Lab Manager Dr Josekutty says banana plants are now the crop in highest demand for multiplying so growers can make new plantings and replace existing farms with disease-free bananas. He said there was increasing interest in using tissue culture to clone suckers from the best producing mother plants in existing blocks to help to improve the productivity of the farm. There is also increasing interest in sourcing disease-tolerant plants from the Queensland Department of Agriculture, Fisheries and Forestry (QDAFF) – particularly plants that have showed promise in planting trials testing resistance to Fusarium wilt disease Panama Tropical Race 4 (TR4). While plant nurseries cannot provide these plants directly, growers who order the plants from QDAFF can have them sent to a QBN-registered nursery (QBN stands for Quality Banana Approved Nursery). At the nurseries the plants can be grown on and hardened off prior to being taken to farms for planting. The timeframe needed to gather, propagate and prepare high quality plants with little flexibility possible in their timetables.

"We want to get orders 12 months in advance because we now produce the best plants," Mr Radke said.

"It’s when you speed things up, or when you slow things up too much, or when you do too many propagating cycles – those are three things that are critical for poor results and getting outtypes," Mr Radke believes a collaborative approach between tissue culture labs and growers gives the best results.

"We’re not plant breeders, we’re propagators, but we do encourage growers to involve us in the breeding selection process," he said.

"The worst thing is if they conduct propagation and then present us with only three to six clones to choose from," Mr Radke said.

"NIASA accreditation makes nurseries more profitable, the figures suggest about 30 per cent more profitable because of better standards and better quality plants produced.

"Our throw out rate is about five per cent of what it would be if we weren’t NIASA accredited. Our disease level for the 1000-plus species of plants we are working with is less than one per cent of what it would be without NIASA."

While labour costs for qualified staff are high compared with those of some south east Asian and South American countries, the high costs are justified by the quality of the plants.

"NIASA accreditation makes nurseries more profitable, the figures suggest about 30 per cent more profitable because of better standards and better quality plants produced."

"We think it’s to our advantage here in Australia that our labour is dear. Because our labour is expensive we have to do things right and the smartest and cheapest way to do that is having highly qualified staff doing things perfectly, once only, and having a proper set up so you’re not having losses and throw outs and disease and other issues."

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Nursing a headache
CUTTING PLANTS TO SMOOTH PRODUCTION CYCLES

Following Cyclone Yasi in 2011, many growers have taken another look at nurse suckering. Queensland Department of Agriculture, Fisheries and Forestry (QDAFF) Principal Horticulturist Jeff Daniells and Senior Development Horticulturist Stewart Lindsay report.

The banana industry’s recent cyclone recovery project recommended the development of a database of crop cycle information for nurse suckering done at different times of the year. This article starts this process by looking at records generated by past research trials at DAFF’s South Johnstone Research Station.

When nurse suckering was first developed in the 1950s it was widely used in northern Queensland to help confine fruit production to the Winter-Spring period when prices were highest on the southern markets. This remained the norm during the 1950s and 1960s. Since then, nurse suckering has experienced revivals following cyclones because it can delay production of fruit and so avoid production gluts and associated low market prices. Nurse suckering has also been used to arrange farm production to provide more constant fruit supplies through the year, to make the time of harvest more uniform within a block and to rejuvenate older ratoons.

Present opportunities
These days, because north Queensland supplies nearly 90 per cent of the Australian market, fruit is required year-round in relatively even quantities. Nurse suckering is very effective for adjusting the time of production to achieve this continuous supply across the farm. If you want bunching and harvest in particular months of the year when should you be nurse suckering?

Our studies at DAFF South Johnstone prior to a few years ago were limited to using nurse suckering to schedule bunching and harvest to particular times of the year better suited for rating for leaf spot disease and for the maturity bronzing fruit disorders. More recently in our cyclone recovery work we investigated some additional times. Bunching and production times obtained at South Johnstone are shown in Table 1. In summary, nurse suckering at South Johnstone tended to give the cropping patterns shown in Table 2.

These times are based on our set of conditions at South Johnstone. Just exactly when bunching and harvest occurs following nurse suckering on your property will depend upon the particular set of conditions including crop management and climatic conditions (largely temperature).

Any historical information you have for nurse suckering on your farm will be valuable for adjusting timing strategies appropriately. As always, good farm records improve future decision making.

Getting cyclone-ready
Cyclones are most likely to occur in north Queensland from December to April. The three very severe cyclones which flattened banana crops in the Innisfail-Tully region during the past 30 years all occurred during February-March. Two strategies can be utilised in the lead up to the cyclone season. Firstly, it is advisable to have what you consider to be an appropriate amount of your crop as small unbunched plants (<1.5 m tall) and as small unbunched plants (<1.7 m if plant crop or <2.0 m if nurse suckered). These plants should be deleafed prior to the cyclone’s landfall to better resist wind damage. These strategies can be put in place by establishing plant crops at the appropriate time but can also be scheduled by nurse suckering. However, crops ready for a December cyclone event are not so ready come March-April. Therefore, additional blocks would need to come into play as the cyclone season progresses. If you require suitable small unbunched plants over this period from ratoon, nurse suckering should be undertaken in the period October to December.

Table 1. Bunching and production times at South Johnstone resulting from different nurse suckering times.

<table>
<thead>
<tr>
<th>Nurse cut down</th>
<th>Sucker set on nurse</th>
<th>Bunching</th>
<th>Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early May 2011</td>
<td>Jun 2011</td>
<td>50% Jan 2012</td>
<td>50% Mar 2012</td>
</tr>
<tr>
<td>Early Aug 2011</td>
<td>Sep 2011</td>
<td>50% Feb 2012</td>
<td>50% May 2012</td>
</tr>
<tr>
<td>Late Jul 2011</td>
<td>Nov 2011</td>
<td>50% May 2012</td>
<td>50% NovDec 2012</td>
</tr>
<tr>
<td>Mid Dec 2012</td>
<td>Feb 2013</td>
<td>50% Aug 2013</td>
<td>N/A</td>
</tr>
<tr>
<td>Jan 2013*</td>
<td>Mar 2013</td>
<td>50% Sept 2013</td>
<td>N/A</td>
</tr>
<tr>
<td>Feb 2013*</td>
<td>Apr 2013</td>
<td>50% Nov 2013</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* Nurse suckering involved physically cutting down nurse and gouging out growing point as per Daniells et al. Nov 1997 (Soil and Vegetables p.58. ** 2011 dates – chemical treatment of non-bunched plants and remove canopy or cut down bunch and canopy on bunched plants. All 2012/13 dates were chemically hedged followed by canopy removed.

Table 2. Cropping patterns resulting from nurse suckering conducted at South Johnstone.

<table>
<thead>
<tr>
<th>Cut down</th>
<th>Bunch emergence</th>
<th>Bunch harvest</th>
<th>Months (cut down to harvest)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>September*</td>
<td>N/A (Nov/Jan)</td>
<td>11-12</td>
</tr>
<tr>
<td>February</td>
<td>November</td>
<td>N/A (Feb)</td>
<td>12</td>
</tr>
<tr>
<td>May</td>
<td>January</td>
<td>April</td>
<td>11</td>
</tr>
<tr>
<td>June</td>
<td>April</td>
<td>April</td>
<td>10</td>
</tr>
<tr>
<td>August</td>
<td>February</td>
<td>May</td>
<td>9</td>
</tr>
<tr>
<td>October</td>
<td>May</td>
<td>September</td>
<td>11</td>
</tr>
<tr>
<td>December</td>
<td>August</td>
<td>Nov/Dec</td>
<td>11-12</td>
</tr>
</tbody>
</table>

* Average month shown – actual spread usually 2-4 months. ** Harvest date adjusted to today’s thinner caliper grade.

Rematch set for Chloro & biopest oil
A recent survey conducted with growers from north Queensland revealed that there has been an increased interest in the use of chlorothalonil as a replacement for biopest oil and the industry standard mancozeb to control yellow Sigatoka.

This change has been largely due to the rising price of the product as well as the belief biopest oil-based programs are ineffective against the pathogen.

A field study has been conducted at the South Johnstone Research Station to evaluate the efficacy of chlorothalonil and paraffinic oil alone and in tank mixes with triazoles (difenoconazole, spinoconazole, propi-conazole, tebuconazole), pyrimethanil and fluopyram, as well as mancozeb mixed with paraffinic oil.

However, the last growing season was characterised by low disease pressure and therefore the experiment will be repeated during 2014 to confirm the outcomes of the 2013 trial.

For more information contact: Alf Canino Tully Manager P 07 4068 3783 F 07 4068 3786 M 0429 721 700 E alf@attransport.com.au

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Depots: Tully, Cairns, Townsville, Mackay, Brisbane & Sydney Delivering to all Southern Destinations
**Bedtime stories for banana growers**

They’re a quicker, cheaper and more flexible way to plant, so why don’t more growers use pre-formed and permanent beds?

**The concepts of pre-formed and permanent beds are not new to the banana industry.** However, despite the many benefits they provide, they continue to be a rare practice among growers.

The two types of beds can be used together to support each other or individually, depending on a farm’s management practices.

Here is an explanation of the terms ‘pre-formed’ and ‘permanent’ and some of their advantages.

### Pre-formed beds

Pre-forming refers to the practice of getting a banana plant block ready well in advance of the planting date. This means all of the ground preparation and the formation of banana-row beds is carried out and the block is then left to sit fallow, generally over the wet season. When the block is ready to plant, the rows are simply sprayed out and any cultivation is restricted to the row. This leaves the inter-row space intact, maintaining ground cover and also providing a hard, trafficable inter-row space for the plant crop.

**Advantages include:**
- Opportunity to take advantage of short windows of fine weather for planting
- Quicker planting after rain as the raised beds dry out faster than flat ground
- Allows wet season planting and generally more flexibility in the planting schedule
- Improved inter-row access and trafficability

### Permanent beds

The term ‘permanent beds’ refers to the practice of leaving the row in the same place crop after crop – often with no, or very limited, ground preparation to the inter-row space.

Growers find there are advantages in only cultivating the banana-row bed, including:
- Reduced cultivation as only half of the block is cultivated, therefore it is cheaper, faster and means less of the block is susceptible to erosion
- Plants do not come into contact with the compacted inter-row soil which may restrict root growth
- Subsoil and topsoil are less likely to be mixed, especially in blocks with surrounded rows that require the whole block to be flattened before re-forming rows
- Plant block: inter-row spaces are already compacted and trafficable as they have not been disturbed, therefore machinery and vehicles are less likely to cause ruts
- Ground cover can be maintained in the inter-row spaces of fallow and plant crops
- Lime, magnesium and mill by-products can be applied just to the row, reducing costs

### Different ways of doing your block

**Gavin Eilers: preventing ruts**

Machinery taken into plant-crop blocks was forming ruts at an unsustainable property. Farm manager Gavin Eilers realised the benefits of pre-formed and permanent beds helped.

Gavin Eilers is the manager of LMB Farming’s Stockton Road farm where he grows both Cavendish and Lady Finger bananas. Gavin has integrated pre-formed beds and permanent beds into his farming system making them standard practices that he has been using for the past five years.

Ruts (wet areas in the block) were becoming a problem he believed was mainly starting in the plant crop. Gavin has gone on great lengths to avoid the creation of ruts in his blocks.

"When we were working up the whole block, we found once we started going into the plant block every week with machinery we were starting rut problems,” Gavin said.

“This was because the soil was soft and we didn’t have enough grass. By leaving the rows in the same spot, we have a hard surface from the start for the machinery to drive on, and the grass is already covering the whole inter-row.”

Gavin said that permanent beds have now rectified this problem. He also finds other benefits from using permanent beds, such as reducing his total inputs by 50%. He has gone to great lengths to avoid the block being any night as much as usual for the ground ready for planting.

“Normally we would have to disc across the block in both directions a number of times to flatten the block out because we grow on ruts. Then we would reform the rows.

“By leaving the rows in the same place we avoided a lot of this work.”

“This time we disced along the row twice to knock the bananas down and then as required to control volunteers. When we were ready to plant we ran the disc along each side of the row to put the dirt up on the row.

“We then ripped the row once, rotary hoed each side and the top of the row in three separate passes and then planted. A few weeks after we planted the bananas we ran the ‘V’ blade up the inter-row.”

Gavin finds there is a lot less work involved by maintaining the rows in the same place. He injects glyphosate (Roundup®) into the previous banana crop and believes this is a crucial practice as there is nothing left of the crop by the time he needs to prepare for planting. If there are ruts in the block, he will fix these spots with cultivation confined to the problem area.

When getting the rows ready he uses GPS guided equipment and prepares the row only and leaves the inter-row space vegetated. First he will spray the row with glufosinate (Basta®), rip once and then do a single pass with the rotary hoe.

**S Lowe & Sons: trialling beds**

Tully’s Barry and Stephen Lowe have tried permanent beds for the first time at their farm on Davidson Road, Tully. Stephen talks about how they got started.

“Tried it (permanent beds) for the first time and we will just see how it goes before we go any more plant like this,” said Stephen.

There were a few benefits from leaving the rows in the same place and not working up the entire block. It was cheaper, faster to prepare and we didn’t end up with any of the compacted soil on the row.

Leaving the rows in the same place meant the Lowes did not cultivate the block anywhere as much as usual for the ground ready for planting.

“Normally we would have to disc across the block in both directions a number of times to flatten the block out because we grow on ruts. Then we would reform the rows.

“By leaving the rows in the same place we avoided a lot of this work.”

This time we disced along the row twice to knock the bananas down and then as required to control volunteers. When we were ready to plant we ran the disc along each side of the row to put the dirt up on the row.

“We then ripped the row once, rotary hoed each side and the top of the row in three separate passes and then planted. A few weeks after we planted the bananas we ran the ‘V’ blade up the inter-row.”

Everything that we planted this year was pre-formed. The main benefit we find is knowing we are able to start planting in August.

“When we finish with a block, if there are major ruts or we need to change the row direction, we will flatten the rows and laser level the block.”

“However, if no work is required, we will chain the bananas down, spray the bananas out with Roundup® and tidy-up the shape of the rows.”

Patrick said their ground preparation and planting is now all performed with the aid of GPS guided machinery.

“With the guidance of the GPS, we set the discs up inside the discs sit just on the bottom of the V and the outside of the discs above the row. This helps knock the edge off the row.

“We then come back past with the V blade. This is all we will do to re-shape the rows. We then leave the block to sit until we are ready to plant.

“When we are ready to plant, we will spray the top of the row and let the grass dry. Then we will rip the top of the row twice, by travelling up and back, and do a single pass with the rotavator. We find the rotavator is really effective at picking up any remaining pieces of string and it doesn’t get choked up by the string like a rotary hoe does.”

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**Gavin MacKay: wet season planting**

Gavin MacKay of Mackay Estates’ Bolinda farm has found there are a number of advantages of using pre-formed beds.

“We see a number of benefits from pre-forming our plant blocks,” Gavin said.

“The main one is the planting window. By having the block ready, it gives us the opportunity to plant in the wet season if we choose to.”

“We then can get our plant in our plant in earlier after rain as the formed rows dry out faster than flat ground.”

Gavin said other benefits were the prevention of soil movement during the wet season and the improved trafficability of the plant block’s inter-row space.

Currently we prepare the block as per usual and leave it with a grass fallow. If we have a nematode problem we would look at using a non-host fallow crop but most of the time it’s just a grass fallow. Down the track we may also look at using a wick wiper in the inter-row before planting to get a good ground cover established early.

“We also find we get a chance to get rid of some of the problem weeds as they are easier to control before the bananas are planted.”

Gavin didn’t believe there were any problems associated with this practice as they prepared the block exactly as they normally would. The MacKay family have been pre-forming their plant blocks for a number of years and each year they try to prepare some of their plant blocks this way. All of the MacKay’s ground pre-pparation activities are performed with the aid of GPS-guided machinery. First they survey the farm by driving over it with a GPS-guided tractor that allows them to produce a map showing the gradient across the block.

Then they prepare the block as usual and, with the aid of GPS guidance, ensure the row and even inter-row spaces are positioned correctly. Where possible, the row spaces will be kept in the same location over successive banana crop cycles.

“If, at the end of the crop cycle, the block doesn’t require any major renovations, we will leave the rows in the same place and just reshape the inter-row space.”

“Gavin MacKay family get their plant bananas in August.

Farm manager Gavin MacKay of Mackay Estates’ Bolinda farm has found there are a number of advantages of using pre-formed beds.

A pre-formed bed at LMB where both pre-formed and permanent beds have helped prevent ruts.

Stephen Lowe has tried permanent beds at the family’s Tully farm.

A pre-formed bed at the Leahy’s Tully farm.

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**Leahy Family: on-time planting**

Pre-formed beds helped Tully’s Leahy family get their plant bananas in earlier.

The Leahy family began pre-forming their plant blocks nearly 10 years ago. They have continued using this practice and Patrick Leahy said that this year all of their plant bananas went into pre-formed beds.

“Everything that we planted this year was pre-formed. The main benefit we find is knowing we are able to start planting in August.”

When we finish with a block, if there are major ruts or we need to change the row direction, we will flatten the rows and laser level the block.

“However, if no work is required, we will chain the bananas down, spray the bananas out with Roundup® and tidy up the shape of the rows.”

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A pre-formed bed at the Leahy’s Tully farm.
Scholar looks at biologicals ahead of US study trip

North Queensland agronomic consultant Liam Riedy (pictured below) has begun research into biological controls for banana plant diseases ahead of a study tour being funded by a banana industry scholarship.

Mr Riedy has won the 2013 Mort Johnston Professional Development Scholarship and will use the $10,000 prize to fund a visit to the United States next June.

Mr Riedy, from Wongaling Beach, works with consultancy group Total Grower Services (TGS).

He is researching biological fungicides that could be used as an alternative to current chemical treatments for banana diseases such as yellow Sigatoka.

“I and the TGS team have begun research on many biological control methods that could be used to control disease in the soil as well as applied to the leaf,” Mr Riedy said.

In the US, Mr Riedy will visit compost developers and see a range of integrated pest management systems and crops.

Mr Riedy said the use of biological fungicides – products based on microorganisms used to control fungal diseases, bacteria and nematodes – had potential as a solution.

“Chemical resistance to fungicides is actually one of the biggest issues for the banana industry,” Mr Riedy said. “Even though we’re the largest horticulture industry in Australia we’re considered by chemical companies to be very minor in terms of our use of chemical treatments.

“That means that our access to new chemical treatments that can greatly assist the industry with issues such as fungal disease is extremely limited and it’s difficult to get registrations for older chemi-

cals as well.

“Biologicals will be a big thing if they can be shown to work in bananas,” Mr Riedy said.

The Mort Johnston Professional Development Scholarship is awarded annually by the Australian Banana Growers’ Council (ABGC) to honour the memory of Tully grower Mort Johnston by offering assistance for projects that advance the banana industry.

New phases for banana trials

Over the past nine years the Gates Foundation has funded a project working to increase provitamin A and iron levels in Ugandan bananas. Separate research is also trialling modified plants for Fusarium wilt resistance.

In 2012, Phase 2 field trials commenced at South Johnstone Research Station to further investigate strategies to enhance pV A levels as well as conduct more detailed and extensive analyses of the elite banana selections identified in Phase 1.

Recently, fruit of some of these latter selections was sent to the United States for a trial to determine how effective the enhanced provitamin A of the banana fruit was in boosting vitamin A levels in the body.

The Phase 2 work also includes a plantation of bananas engineered for higher levels of iron in fruit, the results of which will be progressively available over the next 18 months.

First field trial

In 2009, the first Australian field trial of transgenic bananas was established at the Queensland Department of Agriculture, Fisheries and Forestry’s South Johnstone Research Station (see Australian Bananas 2009 Vol 28 p49).

Despite being flattened by tropical cyclone Yasi midway through the Phase 1 trials. Witnessing the Gates’ commitment to new chemical treatments for black Sigatoka banana diseases, the research has now been extended to field trials where GM Lady Finger and Cavendish are being tested for resistance against TR4 Fusarium wilt on a grower’s property in the Northern Territory. Results are so far very encouraging.

James Dale (centre) and the team of NARO scientists at the first Ugandan field trial site in 2010.
Ugandans eat more bananas than anyone else, drink banana beer and have a word for a banana variety which also means “food”. Jeff Daniells of Queensland’s Department of Agriculture, Fisheries and Forestry (QDAFF) attended an international banana workshop in Uganda. He provided this report with Deborah Karamura of Bioversity International, Uganda.

Uganda is located on the equator in East Africa, inland from Kenya on the coast. Its land area is 236,000 square kilometres, about the size of Victoria, with a population estimated at 37 million.

Despite being on the equator, the climate is considerably moderate because of its elevation ranging between 600 and 5,100 metres above sea level. More than two thirds of the country is a plateau lying between 1,000 and 2,500 metres above sea level. Average annual rainfall varies between 750 mm to 1,500 mm, depending upon location, and is fairly reliable and relatively well distributed (usually in the range of 50-175 mm/month) throughout the year.

The capital city, Kampala, is situated in the central district. At an altitude of 1,200 metres and near to the equator it also borders the world’s second largest fresh-water lake, the 69,000 km² Lake Victoria. Temperatures seldom vary much from the average max and mins of 26°C and 17°C. Thus the climate is relatively idyllic for bananas and people alike.

The staple diet

With climate so favourable, combined with suitable soils, it is probably not surprising bananas have become so important for Uganda. And despite the modest size of the nation, it is actually ranked as the second largest producer of bananas in the world with 10 million tonnes annually, representing 8 per cent of world production. This compares with the largest producer, India, at 20 per cent and Australia’s 0.25 per cent.

Most of the production is consumed domestically and average per capita consumption is a whopping 280 kg annually, the highest in the world. Banana production is dominated by the East African Highland Banana (EAHB) at about 80 per cent and includes both cooking ‘matooke’ and brewing ‘mbidde’ types. They are most extensively grown at elevations between 1,000 to 2,000 metres.

The main production areas are located in the western/south western and central regions of the country. These cover vast areas of the total area under bananas in Uganda, estimated at 1.9 million hectares. Annual yields are between 10 to 20 tonnes per hectare. Production is mainly by smallholders, each farming around one hectare, and mostly for domestic consumption with fewer than 10,000 tonnes exported to neighbouring countries including Kenya.

Fruit of the matooke cooking bananas are harvested green, steam-cooked, mashed or pounded into a meal to provide a starchy staple nutritionally similar to the potato. This preparation is also referred to as matooke and is one of the national dishes of the country. It is typically eaten with a sauce made of vegetables, ground peanut, or some meat such as goat or beef. Matooke is so important a part of the diet that the word ‘matooke’ is synonymous with the word for ‘food’ in Uganda.

Banana beer

Banana beer is an important alcoholic beverage produced in Uganda as well as in other East African countries. It is traditionally brewed using mbidde bananas which contain more tannin in their fruits than the matooke cooking bananas so making them unsuitable for cooking because of the bitter taste. The beer banana fruit is harvested when mature, ripened and squeezed to produce juice that is fermented (with sorghum) to make beer. Some other types of bananas are also used to make beer including Ducasse and Bluggoe. It is in high demand for social functions and in rural communities where currency is often limited, locally brewed beer acts as a liquid currency.

Banana wine making has also been introduced in some banana conservation sites to add value to the current genetic diversity so strengthening conservation strategies for the crop.

Varied diversity

East Africa is recognised as a secondary centre of global genetic diversity for bananas with a considerable amount of this diversity located in Uganda.

This diversity in East Africa is primarily in the East African Highland bananas but it has only in recent times been more widely appreciated that there are important popular unique AA diploid subgroups including Matooke, Sukali and Ndizi which are contained within this broader East African Highland Banana group. They are not confined to triploid AAA like Cavendish and there is also a unique AAB subgroup Sukali Ndizi which is related but distinct from Silk (the equivalent of Old Sugar in Australia, not Ducasse). There is a very small export market for this banana type in Europe with an estimated 2,500 tonnes imported from East Africa annually.

A notable and popular cultivar of the Sukali Ndizi subgroup is Kamaramaseenge. Gros Michel is a relatively popular dessert banana widely distributed in East Africa.

Disease threats

Despite the tranquil scene of endless rolling hills of bananas, the threat of major diseases is very real. Banana Xanthomonas Wilt (BXW) is a bacterial wilt disease currently confined to East Africa.

The plant wilting/death it causes is very similar to Moko disease which is present in the Philippines. During Jeff Daniells’ visit, he had the opportunity to see many thousands of hectares of bananas as he travelled from Kampala to Mbarara to Fort Portal and back to Kampala. But surprisingly no one was able to show any BXW and the bananas we travelled past also looked quite healthy.

The story is that BXW is mainly a problem in regions where certain types of ABB banana, such as Ducasse, are common. Ducasse and other ABB bananas are highly susceptible to insect vector transmission of the wilt pathogen and are mostly grown in central Uganda where Jeff did not have the opportunity to visit.

BXW is also a problem for East African Highland Bananas that are not well managed, as in parts of the eastern Democratic Republic of the Congo.

Very good management (production is for markets) and few ABB bananas in south-western Uganda have prevented the disease from getting established. It is unclear exactly just how much of a threat BXW would be to well managed Cavendish plantations in Australia.

Appropriate management should be able to adequately contain the disease, but in our higher rainfall environment in north Queensland and with many plantations subject to inundation of floodwaters any outbreaks that might occur could have flow-on effects down the catchment.

Banana bunchy top is widespread in neighbouring Burundi and the Democratic Republic of the Congo and looms large on the horizon as a major threat to the world’s greatest banana consumers.

Lyca is out and bunches are in for Ugandan cyclists. Bicycles are often used to transport bunches to market.
Is rating food a five-star idea?

For a long time, well-intentioned people have tried to come up with ways to “rate” or “grade” food in such a way that, with one look, anyone can determine its healthiness. We have been trying to concoct a grading system for years, never with a perfect solution. For example, how would you grade cheezels? It is a great source of protein and calcium, the mineral needed for healthy bones, yet it is also high in sodium (salt) and fat. Does that mean it is good or bad?

The government is doing its best to create a front-of-pack labelling algorithm to create a star rating system based on half-star increments to a maximum of five stars. It is hoped this will help the public make healthier choices at the supermarket.

Five-star bananas?

Fresh food. Dietitian Glenn Cardwell rates the concept.

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Food regulators are designing a five-star scale to help consumers assess the nutritional value of fresh food. Dietitian Glenn Cardwell rates the concept.

Making health claims

You may recall that in 2005 the government proposed that no health claim could be made for a food that had more than 16 grams of sugar in a serve. That effectively meant a small banana could have a health claim, but a large banana couldn’t. An unripe banana could also have a health claim, but as it ripened and the starches turned to sugar, you would have to remove the health claim. Naturally we wrote back to the government explaining the problem.

Eight years later, they have been more sensible and agreed that fruit should be able to make a health claim for any of its abundant nutrients. The key nutrients in the banana for which a general health claim can be made are fibre, potassium, folate, vitamin B6 and carbohydrate. As the banana is a good source of potassium, it can claim that it “contributes to normal muscle function”. For folate it can be said the banana “contributes to the reduction of tiredness and fatigue”. The carbohydrate “contributes energy for normal metabolism”. There are many other general claims under Food Standards Code 1.2.7 that can be made for the banana and other fruits, but no fruit can claim to prevent or cure disease.

Keep it simple

In truth, food is neither good nor bad, it is the amount you eat and how it is prepared that determines whether it is doing you good or not. Put another way, everyone agrees that fruit and vegetables are good for you, fewer than seven of every 100 Australians actually eat enough fruit and vegetables to be good for them.

Although it seems to be convenient to grade food on a short list of components such as the salt, saturated fat and sugar content, the nutritional value of a whole food can be easily misinterpreted. If I were in charge I would really simplify things. All fresh fruit and vegetables are five stars. All fresh food can claim “absolutely sensational for the health of your body and mind. Eat them”. Does it really need to be more complicated than that? Oh, and bananas “make your body sing” too.

Robert Mayers in reef-grants role

Bartle Frere grower Robert Mayers (pictured above) has been appointed by the Australian Banana Growers’ Council (ABGC) to work as the Reef Water Quality Grants Officer for the banana industry in the wet tropics.

Robert will work from the South Johnstone Research Station. He will assist banana growers with applications for the second phase of the Australian Government’s Reef Water Quality Grants Program. Robert will also assist growers with related extension work.

Applications are now open for 2013-14 and 2014-15 financial year grants. Projects should be registered by February 7, 2014 with growers working with Robert to submit a complete application by March 17, 2014.

Robert will work with Terrain NRM on the program which is funded by the Australian Government’s Caring for our Country initiative. Robert can be contacted by emailing robert.mayers@abgc.org.au. Further information on the grants is available on the Terrain website www.terrain.org.au.

ABGC – Representing Banana Growers

Our mission

We advance the interests of Australian banana growers through effective leadership and representation that ensures a strong industry future.

Our role

• Formulate and advocate industry policy
• Communicate information to our members, all banana growers and stakeholders
• Participate in the IAC to implement the Banana Industry Strategic Plan and, as a member of Horticulture Australia Ltd, ensure it works effectively and efficiently for the benefit of levy payers.

Our goals

• Maintain and encourage grower membership of the ABGC
• Ensure good industry outcomes for marketing and R&D initiatives
• Build and maintain effective relationships with all stakeholders to ensure the integrity of the Australian Banana Industry
• Maintain an effective and professional organisation.

Key issues

• Effective biosecurity measures for pest & disease management
• No banana imports – ensuring an appropriate, scientifically rigorous system for Government import risk analysis
• Ensure continued and increased R&D investment by the Government
• Effective communications with key stakeholders including policy makers and key-decision makers
• Effective research, development and extension
• Banana marketing – achieving a strong market for Australian bananas and recognition of their value as a healthy, energy-providing snack
• Supply chain issues – working with our industry partners
• Together with other national horticulture industries, advocate for a range of improvements to reduce banana growers’ costs.

Our Members

We have grower and affiliate members. Our grower members are banana producers from Queensland, New South Wales, Western Australia and the Northern Territory. Under ABGC’s Rules, the legal owner or owners of a banana plantation in Australia with at least half a hectare of bananas under production (Commercial Banana Plantation Owner) may apply to become a member of ABGC.

We also have affiliate members – non-growers who have joined the ABGC as a way of showing their support for, and involvement with, the banana industry.

Our board

Our Board of Directors currently comprises seven Directors – five from Queensland and two from New South Wales.

We are seeking a Director from Western Australia/Northern Territory.

Our Directors are: Doug Phillips, Chairman (Qld), Adrian Crema, Vice-Chairman (Qld), Paul Johnston, Treasurer (Qld), Peter Molenar (NSW), Marc Darveniza (Qld), Steve Lizzio (Qld) and Stephen Spear (NSW).

For more information, please see the ABGC website, www.abgc.org.au or contact ABGC’s Chief Executive Officer: Jim Pekin by phoning 07 3278 4786.

ABGC Board meeting, May 2013

“If I were in charge I would really simplify things”
Protecting your fruit since 1990