

# **Horticulture Innovation Australia**

## **Final Report**

### **Integrated management of Yellow Sigatoka and other banana diseases in Far North Qld**

Jim Pekin  
Australian Banana Growers Council Inc

Project Number: BA12007

**BA12007**

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Level 8, 1 Chifley Square  
Sydney NSW 2000  
Tel: (02) 8295 2300  
Fax: (02) 8295 2399

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## Keywords

Yellow Sigatoka; leaf speckle; leaf spot; *Mycosphaerella*; Banana; surveillance; monitoring; biosecurity.

## Summary

Leaf Spot (yellow Sigatoka) and Leaf Speckle are endemic fungal diseases of bananas in all major production areas except Western Australia. The importance of maintaining effective control of these diseases relates not only to their impact on cost of production but also because of their potential to mask outbreaks of the similar looking but far more destructive exotic disease, black Sigatoka. Both yellow Sigatoka and leaf speckle are prescribed pests meaning growers are required by State government regulations, to keep leaf levels below 5%. Plant health authorities in the respective states have a responsibility to ensure compliance with regulatory requirements but in recent years, their capacity to undertake the necessary surveillance to ensure compliance has significantly diminished.

The major aim of this project was to provide a resource (the yellow Sigatoka liaison officer, YSLO) to assist growers in north Queensland (NQ) achieve compliance on a voluntary basis. This occurred by undertaking leaf inspections, educating growers about leaf diseases, and sharing information between growers, other stakeholders, government and university research staff. Having a dedicated resource also allowed Biosecurity Queensland and relevant scientists in DAFQ to be alerted when any other suspect banana diseases were found. The second aim of the project was to support growers in best practice disease management (BMP) by providing banana biosecurity extension advice on any other diseases. The YSLO's role changed as a result of the Panama TR4 incursion (of March 2015) requiring elevated farm biosecurity measures and this was supported by the YSLO.

The project was highly successful with comprehensive disease surveillance data collected from 98% of farms in the NQ region. Biosecurity BMP for disease control was promoted through a wide range of educational material and activities as well the dissemination of information through various media channels to growers and the communities of NQ. Leaf specimens were taken which allowed the confirmation of leaf spot diagnosis and some testing for fungicide resistance. Complaints of excessive disease levels were also investigated and acted upon within 48 hours.

Through the work of the YSLO, 98% compliance with relevant leaf spot legislation was achieved in NQ through a voluntary industry approach. This substantially reduced the need for regulatory intervention with considerable saving to the government, and greater biosecurity for the banana industry as a whole. Low disease levels help maintain a consistent quality and supply of bananas and minimize production costs. Data generated during the project is an important resource for ABGC and BQ to monitor and understand disease outbreaks in the target region and assess compliance levels with legislation. Professional working partnerships with BQ and DAFQ were achieved through the YSLO which facilitated and enhanced biosecurity for the banana industry. These features were of fundamental importance during the TR4 emergency response which allowed a rapid, proficient response, promoted understanding about TR4 management and containment and assisting growers to meet their biosecurity obligations. Containment of TR4 is critical to reducing the impact of this disease on banana production in Australia's largest production area.

Owing to the success of the project, it is recommended that the role of the YSLO be continued to provide effective disease surveillance, biosecurity extension advice and integrated disease management in NQ.



# Introduction

Yellow Sigatoka or 'leaf spot' is caused by the fungus *Mycosphaerella musicola*, and is an established endemic disease in all major production areas except Western Australia. Leaf Speckle is also an endemic disease caused by three different fungi (*Mycosphaerella musae*, *Ramichloridium* sp., and *Cladosporium* sp.). These diseases not only affect the banana leaves, but also bunch weight and fruit quality. Field-ripe bunches harbour fruit fly and are unmarketable. Yellow Sigatoka also has the potential to mask an outbreak of the similar looking, but far more destructive exotic disease black Sigatoka. Keeping these and other diseases under control are crucial to the ongoing viability of the Australian banana industry.

Both yellow Sigatoka and leaf speckle are prescribed pests of bananas under Queensland and New South Wales legislation. This means that growers are required to keep yellow Sigatoka leaf levels below 5% by State government regulations. Plant health authorities in the respective states have a responsibility to ensure compliance with regulatory requirements but in recent years their capacity to undertake the necessary surveillance required to identify examples of non-compliance, has significantly diminished.

The July 2011 revision of Biosecurity Qld's '*Biosecurity Plan for North Queensland: Yellow Sigatoka and Leaf Speckle diseases*' indicated that the Department would continue to provide a responsive regulatory service only to reports of excessive levels of both diseases in commercial plantings. Without any surveillance activities, this methodology relies entirely on individual growers or other informed members of the community identifying outbreaks and reporting them. This situation represented an unacceptably high risk level to the industry. The model developed by the 2009 yellow Sigatoka surveillance project, whereby industry takes on greater responsibility in managing endemic diseases and leaving Biosecurity Queensland (BQ) to focus on new pest or disease incursions, has been hailed as a model of partnership between government and industry.

Between 2010 and 2012, funding was provided through HAL-BA09055 for a dedicated the resource (the yellow Sigatoka Liaison Officer) to monitor leaf disease levels and encourage voluntary compliance with the relevant legislation in commercial plantations in Far North Queensland. This project was highly successful in terms of monitoring, reporting and addressing leaf disease issues on farms in Australia's major production area. It also indicated that having a dedicated resource within the region provides a significant advantage in industry adoption, with all major plantations participating in on-farm inspections. Working closely with BQ, the project achieved a dramatic reduction in regulatory intervention for leaf disease control in the region.

The aim of this project was to continue yellow Sigatoka surveillance and broaden the scope of the project to provide banana biosecurity extension advice to farmers. The new project focused on integrated disease management of yellow Sigatoka and other diseases both on farms and host plants existing in the general community.

Effective on-farm biosecurity is important for the surveillance, prevention and containment of pests and diseases. There is the opportunity for both growers and the community to be better educated about banana diseases, their identification and prevention. If the industry can adopt best practice on-farm biosecurity, it is protecting itself from future exotic pest and disease incursions.

# Methodology

## Personnel

At the commencement of the project (September 2012), a Banana Industry Liaison Officer was engaged to work closely with the North Queensland commercial banana plantations and community, and BQ. The role, known as the yellow Sigatoka Liaison Officer (YSLO) was filled by Mr Louis Lardi who was employed through the Australian Banana Growers' Council (ABGC) with HIA funding. Mr Lardi had effectively conducted this role during the previous project (HAL-BA09055) and had extensive experience in banana production, disease control and surveillance. He additionally had built strong relationships with the North Queensland growers, BQ and was able to provide advice to growers in a practical and authoritative manner. These skills were considered central to the adoption of good on-farm practices.

The YSLO had limited inspectoral powers and conducted regular in-field surveys across the north Queensland production areas (Rollingstone to the Daintree, including Mareeba) to assess the levels of yellow Sigatoka and leaf speckle. The goal was to visit every banana plantation at least twice a year.

The intention of the project was to encourage more active and voluntary compliance to prescribed disease levels through having a visible surveillance presence on the ground. Where levels were found to be approaching prescribed levels, the YSLO worked with growers to voluntarily manage the disease and ensure compliance with the regulations. Where growers failed to respond to the voluntary disease management approach, the property was reported to senior plant health inspectors for action through the regulatory system.

In addition to the surveillance role, the YSLO engaged growers on best practice for biosecurity to improve their awareness and adoption of good on-farm practices. Mr Lardi educated growers on the symptoms of leaf spot, undertook leaf spot inspections and shared information between growers, aerial operators, chemical sellers, government and university research staff. His role was to educate and assist them access information for improving their integrated leaf spot control. The YSLO used a range of extension and communication activities to accomplish the project goals. These included one on one meetings, organization and attendance at growers meetings, field days, radio interviews, and the dissemination of knowledge through leaflets, posters and articles published industry-related magazines, e-bulletins and news.

From March 2015 a major change occurred in the North Queensland industry with the detection of Panama Disease Tropical Race 4 (TR4) in Tully. This dramatically changed the way in which the YSLO undertook his work with many farms going into 'lockdown' in the early stages of the incursion. Since then, the YSLO has been critically important in helping growers manage TR4 and to meet their biosecurity obligations through liaison between growers and BQ on the response to the TR4 incursion.

## **Inspections and data collection**

The entire north Queensland banana production area except Lakeland and Hopevale was targeted in this project which includes:

- Kennedy Valley area including Ingham and Rollingstone
- Murray Upper area
- Mission Beach area
- Tully El Arish area
- Silkwood north to Innisfail area
- Innisfail north to Cairns area
- Tableland area
- Julatten to Daintree

There are 256 farms in this area which were visited twice yearly from 2012-2014. However in 2015, because of the YSLO's involvement in the TR4 emergency response, each farm was visited at least once.

The inspection process was as follows:

- The YSLO phoned farms a few days before he visited an area to make an appointment
- On the appointed day the YSLO would arrive at the farm gate, meet the grower, leave his vehicle at the farm gate and travel the plantation with the grower.
- The YSLO and the grower would drive slowly through the plantation inspecting the plants for leaves which were showing more than 5% leaf area affected by yellow Sigatoka or leaf speckle. An image of a leaf with 5% leaf area affected with yellow Sigatoka is provided in Appendix 1.
- Where there was a leaf with more than 5% area affected by yellow Sigatoka, the YSLO verbally directed the grower to undertake de-leafing (removing the leaf from the banana plant and placing on the surface of the soil to rot) and a regular fungicide spray program. The grower had 7 days to comply with this direction before the YSLO returned to inspect if de-leafing operations had been undertaken.
- If a grower did not comply with this direction then the YSLO issued a letter similar to that shown in Appendix 2.
- If the grower again failed to comply then BQ were notified. BQ officers would visit the property, collect leaf samples and issue a written directive to the grower. The grower had 7 days to comply with the directions of the BQ, if the grower did not comply then regulatory action would be taken and the grower would be liable for the cost of control (de-leafing).
- The YSLO would be notified by BQ of the outcomes of the process.

During each reporting period, a selection of leaf spot samples were taken to confirm the diagnosis of leaf spot and a small number of samples were tested for resistance to fungicides. These tests were undertaken by Kathy Grice from Queensland Department of Agriculture and Fisheries (DAFQ). Samples were tested to confirm that the leaf spots were yellow Sigatoka and not the exotic black Sigatoka. This activity is important to the exotic disease surveillance program.

Data collection:

A personal data assistant (PDA) was used to record project data by the YSLO. This facilitated the speed and ease with which data could be recorded and downloaded and allowed the generation of area maps.

Where a plantation was 'clean', the YSLO was able to simply log his visit into the PDA at the farm gate at the completion of his visit. He was also able to log other details for each farm such as the banana variety, whether or not leaf spot was present and if samples were taken for testing. Only if action were required, would the YSLO would have to record information manually onto paper forms.

When appropriate, the YSLO provided growers with a copy of the Department of Agriculture and Fisheries leaflet 'Banana Leaf Diseases' to assist growers with identifying and understanding leaf diseases. The leaflet also had images of symptoms of exotic pests and diseases and instructions for what to do if these were suspected to be present in a plantation. He additionally disseminated information about spray programs recommended by Bayer and Nufarm.

## Outputs

### Leaf Spot

- Comprehensive disease surveillance data was collected from Sep 2012-Oct 2015 from 98% of farms in the north Queensland production area (Table1). This included:
  - the number of farm inspections
  - the number of farms with leaf spot above prescribed levels where the grower then received a verbal directive from the YSLO to undertake voluntary control measures and necessitated a revisit to check for compliance
  - the number of farms with leaf spot above prescribed leaf spot levels which failed to undertake voluntary control measures and were subsequently referred to BQ
  - maps were generated showing location of farms inspected and the leaf spot infections recorded in each 6 monthly period (Appendix 4)
  - 17 residential properties and 14 stands of feral bananas were also inspected with results reported in overall inspections.

Table 1 Disease surveillance data for the northern banana production area between July 2012 and October 2015.

Time period	Number of Inspections	Number Re-visited	Number Referred to BQ	% growers voluntarily compliant
Sep 12 - Feb 13	250	45	6	94
Mar 13 - Aug 13	260	50	9	91
Sep 13 - Feb 14	332	58	6	94
Mar 14 - Aug 14	317	77	10	90
Sep 14 - Feb 15	292	51	6	94
Mar 15 - Aug 15	94	10	1	99
Sep 15 - Nov 15	142	10	0	100
Total	1687	301	38	98

- A wide range of educational material and activities that promoted on farm best management practice for disease control was conducted such as:
  - A two page DAQ leaflet with information about the stages of yellow Sigatoka, photos of the disease and percent leaf area infected was distributed by the YSLO to all growers. This is an excellent educational tool which assists growers to understand leaf spot disease.
  - A shed poster was developed and produced by the YSLO with assistance for the ABGC Communications manager. The poster contained information and photographs about leaf spot disease. This was launched at the Innisfail Ag Day (Mar 2014). Electronic copies of the poster were then distributed to members of the Banana AgriBusiness Manager (BAGMAN) Group and approximately 300 hard copies were distributed to growers in the region.
  - A Standard Operating Procedure (SOP) for the process of inspections was developed by the YSLO. This was later revised following the Panama TR4 incursion in March 2015 to include SOPs for conducting inspections for both diseases. (Appendix 3)
  - The YSLO attended the monthly meetings at Cassowary Coast Banana Growers' Association (BGA) for the duration of the project. He also attended two meetings at the Mareeba BGA and 3 meetings with the BAGMAN group. This allowed the YSLO to provide information on leaf spot control as well as listen to and address concerns raised during the meeting. Cassowary Coast BGA meetings are attended by around 40 people, about 30 of those growers and 10 being industry associated people (chemical resellers etc.).
  - Feedback was provided to Biosecurity Queensland on a new 'leaf spot agreement' which covers the process for the inspection and data collection, and the limited inspector powers of the YSLO.
  - The YSLO attended a field walk for growers at the South Johnstone Research Station in June 2013. The feature of the day was the Banana Plant Protection Program, in particular the new varieties being screen for resistance to pests and disease (including yellow Sigatoka).
- 44 leaf spot voucher specimens were collected over the duration of the project. These served to confirm leaf spot diagnosis.
- Fungal isolates taken from a small number of leaf samples (3 in total) during the project were tested for resistance to fungicides. Results showed that resistance to strobilurin and triazole fungicides varied from low to high for the three samples taken.
- Growers were encouraged to report disease problems and as such, all complaints of excessive disease levels were investigated and acted upon by the YSLO within 24 – 48 hr.
- Two radio interviews were conducted on North Queensland radio station 4KZ, and 10 articles were published in industry magazines (4 in the Banana e-Bulletin, 2 in Tropical Banana News, 3 in Australian Banana News and 1 in Australian Banana Magazine).

## TR4

Outputs resulting from Mr Lardi's role on the Panama TR4 incursion were:

- The early detection of TR4 in north Queensland occurred because the grower at the (now) infected property alerted Mr Lardi to the yellowing leaves of his banana plants. Mr Lardi then inspected the plants, took samples for testing and a positive diagnosis for TR4 was found.

- Industry and grower specific information was provided to BQ which assisted with the development of the TR4 response
- Advice was provided to many concerned banana growers. This was enabled by strong relationships Mr Lardi has built with NQ banana growers while acting as the YSLO, so that he has become a trusted source of information.
- Where ongoing issues existed, Mr Lardi and BQ simplified processes and forms for easier use by growers.
- Information about the response was provided to industry by Mr Lardi during his participation in daily situation report meetings.
- Organised and participated in industry meetings on the incursion.
- Worked with BQ inspectors to manage the team who destroyed the TR4 infested block at the infested farm.
- Identified stakeholders who required tailored information in the response, such as the Sikh and Hmong communities and organised meetings convenient for those stakeholders. He then led extension of biosecurity best practice management at those meetings.
- Helped to organise the Indian Community into groups for their Biosecurity Training
- Participated in BQ toolbox talks
- Participated in the training of staff working for BQ undertaking inspections
- Tested and validated protocols and maps for BQ and the TR4 extension team
- Participated in on-farm biosecurity training with the TR4 extension team.

## Outcomes

### Leaf Spot

- The northern banana industry achieved 98% compliance with relevant legislation through a voluntary industry approach between 2012 and 2015. This is substantially higher than the goal of 80% compliance outlined at the start of the project. The high level of compliance may be directly attributable to the work of the YSLO in successfully
  - Conducting visual surveillance twice yearly on 98% of farms in the northern production region for early detection and management of leaf spot. Only 5 growers in the entire region refused entry to the YSLO and these were referred to BQ for inspection.
  - Increasing the knowledge and awareness in all growers and local communities in the region of the importance of effective control of endemic pests and diseases.
  - Achieving greater preparedness for the increased disease pressure associated with the wet season in late spring/summer.
  - This was achieved through one-on-one meetings with growers, through the development and distribution of educational material, attendance at local growers associations, field days, workshops, and media releases. This assisted growers to understand and manage leaf spot disease on their farms.
- A significant reduction in regulatory intervention was achieved for leaf disease control as only 2% of

inspections required notifications to the regulatory authority. This resulted in considerable saving to the government and greater biosecurity for the banana industry as a whole.

- Lower levels of leaf spot achieved through the voluntary industry approach kept overall disease levels low thereby reducing production costs and helping maintain a consistent quality and supply of bananas.
- The comprehensive database of banana farms generated from data collected during the project is an important resource for ABGC and BQ to monitor and understand the location, distribution and frequency of disease outbreaks in the target region and assess compliance levels with legislation.
- A professional working partnership was achieved through the YSLO with BQ and DAFQ in North Queensland. Greater awareness, communication and understanding between government departments and banana growers, facilitates coordination and enhances biosecurity for the banana industry.
- Collection and testing of leaf disease samples by DAFQ contributed to accurate disease diagnosis and the exotic disease surveillance program. This monitoring is critical for the early detection of exotic disease.
- Testing of leaf isolates for fungicide resistance indicated variable resistance to strobilurin and triazole exists in the environment and may indicate a need for more intensive monitoring in a future project. This type of testing by DAFQ gives an indication of the effectiveness of currently available chemical control measures for leaf spot disease.
- A working relationship was established with aerial fungicide spray operators to monitor their observations regarding disease pressure, fungicide resistance and any other issues they may have.

#### **TR4**

- The rapid and proficient manner with which Mr Lardi responded to the initial discovery of plants suspected of Panama disease, was of critical importance for the diagnosis and containment of TR4 to the infected property since Mr Lardi knowledge and experience allowed him to make a visual diagnosis and then followed appropriate biosecurity protocols when sampling and leaving the property.
- Growers have been more able to manage their response to TR4 and meet their biosecurity obligations as a direct result of the strong relationships that Mr Lardi has built, liaising between growers, state departments and other stakeholders.
- Greater understanding about TR4 management and containment has been achieved within the industry and the community by the educational talks and extension activities Mr Lardi has developed and distributed in consultation with BQ and DAFQ. This has resulted in greater adoption of biosecurity best management practice in relation to TR4.
- Containment of TR4 to one infected property is critical to reducing the impact of this disease on banana production in Australia's largest production area.

## Evaluation and Discussion

The focus of this project was the integrated management of YS and other diseases, both on farms and on host plants which exist in the general community. This was achieved through yellow Sigatoka surveillance but also through biosecurity extension advice which was provided to farmers and the broader community.

This project was highly successful with delivered outcomes exceeding the original expectations.

The 98% compliance with relevant legislation which was achieved through a voluntary industry approach can be attributed directly to the YSLO Mr Lardi, and the activities he conducted during the life of the project. As the designated resource to achieve project outcomes, Mr Lardi had the right skills for the job being an ex-banana grower and an experienced authority on banana production and the control of diseases. His excellent interpersonal skills enabled him to gain the trust, confidence and cooperation of growers irrespective of their age, motivation, and cultural background.

It was because of this trust that the grower with a diseased plant (later diagnosed with TR4) first contacted Mr Lardi to ask him to inspect the plant. Mr Lardi's knowledge of plant diseases enabled him to make a visual diagnosis, follow correct biosecurity protocols to take samples for testing, and then follow the correct sanitization protocols before leaving the infected property. This was critical for initial diagnosis and containment of the disease.

Visual surveillance of 98% of farms in the north Queensland including all major producers was also achieved by Mr Lardi since he visited all but 5 farms in the target area twice yearly (2012-2014) and at least once in the final year of the project (2015). This high level of surveillance was made possible through the dedication of Mr Lardi to the extensive amounts of travel, cooperation of growers and the project having designated vehicle. This not only resulted in better management of leaf spot but also a lowering of the risk threat concerning emergency plant pests such as Black Sigatoka and other exotic diseases.

Mr Lardi successfully raised the awareness of the importance of effective control of endemic pests and diseases in at least 98% of growers and the broader community. He achieved this using a range of extension and communication activities to accomplish the project goals. Providing information through a variety of means and which were pitched correctly, allowed him to effectively reach large numbers of the target audience and facilitated uptake and adoption of best management practice across much of the industry.

The effective relationships Mr Lardi built between DAFQ and BQ enhanced biosecurity and meant the action of government departments and other stakeholders were coordinated and efficient.

Overall, having a dedicated resource linked closely to the industry and located within the region provides a significant advantage in industry adoption, with all major plantations participating in on-farm inspections.

Critical to the successful adoption of biosecurity best practice was having a person with an understanding of banana production systems to engage with growers and work through issues to find potential solutions that are



practical and realistic. This was achieved in this project and uptake was high, leading to very strong industry support for the project to be re-established. The banana industry via the R&D Subcommittee of the Industry Advisory Committee rated the project highly.

It is likely that the reforms to the Queensland plant protection regulations in future would continue to require NQ banana growers to meet the 5% of Leaf Spot threshold, but in a guideline so as growers meet their General Biosecurity Obligation rather than in a regulation, as it is now. It is therefore even more vital to have a designated resource to facilitate biosecurity best management practice.

Effective on-farm biosecurity is important for the surveillance, prevention and containment of pests and diseases. There is the opportunity for both growers and the community to be better educated about banana diseases, their identification and prevention. If the industry can adopt best practice on-farm biosecurity, it is protecting itself from future exotic pest and disease incursions as well as endemic ones.

## Recommendations

Yellow Sigatoka is a disease which can have devastating consequences to banana production if left unchecked. Cultural control methods where infected leaves are removed are some of the best ways of reducing inoculum levels and therefore the incidence and severity of disease and are appropriate for the northern production zone. This is because

1. The yellow Sigatoka fungi depend on living plant material for survival, and spore dispersal is minimized if infected leaves are removed early before spores are produced. In the moist warm temperatures of north Queensland, conditions are conducive to rapid growth of fungi which is why prescribed levels of leaf infection are 5% all year round. Without the help of the yellow Sigatoka Liaison Officer, it is likely that many growers would fail to meet the requirements and production losses from disease would be much greater.
2. Leaf removal is an effective and suitable control method particularly in the northern production zone where 95% of bananas are grown. The area is dominated by commercial plantations with little interruption by residential areas. Residential banana plants are far less common, are less likely to act as reservoirs for disease and are easier to monitor and inspect than they would be in the more populated areas of SE Queensland.
3. Ongoing monitoring and extension of best management practice by a trained liaison officer provides invaluable biosecurity for the northern production zone since it allows early detection and action when emerging plant pests occur such as black Sigatoka, Panama TR4 and Bunchy top virus.

For the reasons outlined above and the success of the current project in meeting its objectives, we therefore recommend that

1. Funds be made available to continue the work of the YSLO for yellow Sigatoka surveillance and the provision of banana biosecurity extension advice to farmers for another three years.
2. In the new project, the YSLO be authorized under Queensland's new legislation as an inspector for the quarantine zone that includes the Hopevale and Lakeland banana production areas as this will provide greater biosecurity for the entire northern zone.

Ongoing investment in a resource such as the YSLO will facilitate the integrated disease management of yellow Sigatoka and other diseases in North Queensland and provide enhanced biosecurity for the banana industry.

## **Scientific Refereed Publications**

None to report

## **Intellectual Property/Commercialisation**

No commercial IP generated

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Barry Sullivan is acknowledged for valuable assistance with data management and for building maps.

Rhyll Cronin (Communications manager), Jay Anderson (former R&D manager) also provided much support during the project as did the office staff at ABGC

We would also like to thank the banana growers of North Queensland who gave their cooperation and practiced good leaf spot control measures and biosecurity best management practice

## Appendices

**Appendix 1:** Image of a banana leaf showing 5% leaf area affected by yellow Sigatoka (a) and leaf speckle (b). Leaf spot is a prescribed disease in north Queensland which means growers are required to keep leaf levels below 5% by State government regulations.

**(a) 5 % Yellow Sigatoka**



**(b) 5 % Leaf speckle**



**Appendix 2** An example of the letter given to growers who fail to comply with a verbal direction regarding their excessive leaf spot levels.



Date: \_\_\_\_\_

To: \_\_\_\_\_

Dear \_\_\_\_\_

**EXCESSIVE BANANA LEAFSPOT LEVELS**

Banana yellow Sigatoka and/or speckle disease above the 5% regulatory (*Plant Protection Regulation 2002, Section 34*) limit has been detected on your banana plantation located at \_\_\_\_\_

On \_\_\_\_\_ I conducted an inspection at your banana plantation and advised that the banana leafspot levels were above the 5% limit. I re-inspected your banana plantation on \_\_\_\_\_ and banana leafspot levels are still not controlled to below the 5% per leaf limit.

I wish to advise that if action is not taken to control the disease by \_\_\_\_\_ I am obliged to contact Biosecurity Queensland who will issue you with legally binding directions to control the banana leafspot.

Failure to comply with these directions without a reasonable excuse is an offence against the *Plant Protection Act 1989 Section 11 (7)*. A maximum penalty of \$200,000 may be imposed. In addition contractors may be employed under *Section 16* at the owner's expense to control the disease in order to prevent spread to other properties.

A business currently accredited under an Interstate Certification Assurance (ICA) Arrangement for *Hard Green Condition of Bananas [ICA06]* cannot harvest bunches from block subject to a Leafspot Direction for certification under the arrangement.

Please contact Australian Banana Growers Council CEO on (07) 3278 4786 if you feel aggrieved by this process or Rosalie Anderson A/Principal Biosecurity Officer on (07) 4064 1197 if you would like to discuss the banana leafspot regulations.

If you require assistance to control the leafspot on your plantation, a list of contacts for banana contractors is supplied on the attached sheet.

Yours sincerely

Louis Lardi

Yellow Sigatoka Liaison Officer

Australian Banana Growers Council Inc

CC: Rosalie Anderson, A/Principal Biosecurity Officer, Biosecurity Queensland, South Johnstone.

\_\_\_\_\_  
Grower

Unit 3, South Gate East Commercial Centre 250 Sherwood Road ROCKLEA QLD 4106  
PO Box 309 BRISBANE MARKET QLD 4106  
Tel: 07 3278 4786 Fax: 07 3278 4938  
Web: [www.abgc.org.au](http://www.abgc.org.au)

**Appendix 3** The biosecurity protocol to enter farms developed and used by the yellow Sigatoka Liaison Officer both before and after the PanamaTR4 incursion on 4<sup>th</sup> March 2015

**Protocol to enter before 4th March 2015 (when Panama TR4 was detected in Tully)**

- Ring farmer in advance and determine expected date and time of arrival
- Ring farmer in advance and determine expected date and time of arrival
- Drive to farm shed or office
- Upon arrival spray boots with Farmcleanse
- Meet farmer/manager and drive around property in the farmers vehicle
- If farmer/manager is unable to drive around the property then they will supply the officer with farm vehicle or ATV
- When leaving the property spray boots with Farmcleanse
- On a weekly basis thoroughly wash officers vehicle (pressure clean) and spray with Farmcleanse

**Changes to Protocol after 4th March 2015 (when Panama TR4 was detected in Tully)**

- Ring farmer in advance and determine expected date and time of arrival
- Yellow Sigatoka Liaison Officer will be in clothing and boots which are free of mud and plant material
- Make arrangements with grower to determine a pick up point (on a public bitumen road)
- When farmer/manager meets at pick up point spray boots with sterilant product (e.g. Farmcleanse, Sporekill etc.)
- Adhere to individual farms biosecurity practices upon entry to the property. It is expected that each grower will have their own systems to decontaminate onto the property.
- Travel with farmer/manager around the property in farm vehicle
- If farmer/manager is unable to drive around the property then they will supply officer with farm vehicle or ATV
- When leaving property adhere to individual farm biosecurity practices and decontaminate off the farm. Boots will be hosed down on the property if they are muddy.
- Upon returning to pick up point re-spray boots with sterilant
- On a weekly basis thoroughly wash the officer's vehicle (pressure clean) and spray with sterilant. Note in log book that the vehicle has been cleaned. The inside of the car will be kept clean and the pedals and foot-well will be kept clean so that dirt/mud is not transferred from farm to farm.

NOTE: Collection of leaf samples – BQ to advise on any changes to method from the past



**Appendix 4** Yellow Sigatoka inspections conducted during six monthly intervals for the duration of the project. Yellow dots indicated bananas inspected, red dots indicate regulatory actions by Biosecurity Queensland.

























