

• • • • PANAMA DISEASE TROPICAL RACE 4

Biosecurity standards and guidelines

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Panama disease tropical race 4: biosecurity standards and guidelines (Version 1.0 – 20 May 2015)

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1 Purpose

The purpose of this document is to provide advice to banana growers on ‘best practice’ to minimise the risk of spread of Panama disease tropical race 4 (‘the disease’) following the detection of the disease in Queensland.

This advice is presented as Standards and Guidelines for continuing to grow, harvest, and market bananas while controlling the potential risks of spreading the disease.

For properties at risk of Panama disease tropical race 4, but where the disease has not been detected, this information will help improve on-farm biosecurity systems and practices, and prevent disease infestation.

For properties where Panama disease tropical race 4 is confirmed or suspected, this information describes the quarantine conditions that may be applied through Directions and Inspector’s Approvals issued by the Queensland Department of Agriculture and Fisheries (DAF), and provides advice on managing the risk of spreading the disease. This document provides general guidance, whereas the conditions set out in Directions and Inspector’s Approvals are determined on a case-by-case basis to reflect individual farm operations, layout and requirements.

Individual Farm Biosecurity Management Plans will need to be developed by each quarantined property to demonstrate how they are meeting the conditions of any Inspector’s Approval. If there is any uncertainty or contradiction between this document and the conditions of the Directions and Inspector’s Approval, it is the Directions and Inspector’s Approval that take legal precedence and which must be observed.

These biosecurity standards and guidelines for Panama disease tropical race 4 will be updated regularly as required.

2 Abbreviations, acronyms and definitions

ABGC	Australian Banana Growers’ Council
CDA	Controlled drainage area
Clean	Items or areas known to be free of the disease (Panama disease tropical race 4) or free of any substances (e.g. plant material, soil, mud, or dust) that may carry the pathogen (the tropical race 4 strain of <i>Fusarium oxysporum</i> f. sp. <i>cubense</i>)
Clean access road	The main vehicular access route to the clean packing facilities and/or the residence from the infested premises (IP) boundary

Clean water	Water that has not come into contact with agricultural soil or banana plants, or has been treated to remove contaminating organisms (e.g. bore water, rain water that is collected directly into a tank, town water, chlorinated river water)
Contamination	The presence of the pathogen (the tropical race 4 strain of <i>Fusarium oxysporum</i> f. sp. <i>cubense</i>) or substances (e.g. plant material, soil, mud, or dust) that may harbour the pathogen
DAF	Department of Agriculture and Fisheries (Queensland)
Decontamination	Removal of contaminating substances (e.g. plant material, soil, mud, or dust) or the pathogen (the tropical race 4 strain of <i>Fusarium oxysporum</i> f. sp. <i>cubense</i>)
Direction	Under Section 13 of the <i>Plant Protection Act 1989</i> , an Inspector may give directions to the owner of the land directing the owner to either immediately, or within a time specified, take such measures as the Inspector thinks fit to control or remove a pest
Dirty	Describes an area or zone of a property, or any item that may be a contamination risk
Farm biosecurity management plan	A document that a business produces to explain how it will conduct its business using sound biosecurity practices, and comply with any Inspector's Approval issued. It is updated regularly and used by the business in its farming decisions and operations to ensure the property is protected from biosecurity risks and does not pose a biosecurity risk to the broader industry
Guidelines	Recommended best practice for on-farm biosecurity
Infested premises (IP)	A property from which a sample has been taken and confirmed as Panama disease tropical race 4 by the diagnostic laboratory
Inspector	Person appointed as an Inspector under the <i>Plant Protection Act 1989</i>
Inspector's Approval	An Inspector's Approval is a document required under the <i>Plant Protection Act 1989</i> to move certain plants and plant products, and associated soil, equipment or any thing, off an infested property to another place, including into and out of states and territories
Panama TR4	The disease caused by the fungus <i>Fusarium oxysporum</i> f. sp. <i>cubense</i> (tropical race 4 strain)
Pathogen	<i>Fusarium oxysporum</i> f. sp. <i>cubense</i> (tropical race 4 strain)
Property	A group of contiguous land parcels managed as the one farming enterprise

Quarantined property	A property that has been quarantined through a Direction from an Inspector of the Queensland Department of Agriculture and Fisheries under Section 13(1) of the <i>Plant Protection Act 1989</i> . Typically, these properties are ‘infested premises’ and ‘suspect premises’
The Response	Panama disease (tropical race 4) response
RA	Risk assessment
Risk item	Any item that has been in contact, or may have come in contact, with banana plants or soil on which banana plants are, have, or may have been growing, including vehicles, machinery, footwear, clothing, appliances, other farm equipment and any other thing
Standards	Essential conditions required for growing, harvesting and marketing bananas in the presence of Panama disease tropical race 4
Suspect premises (SP)	Premises that have a clear relationship or connection with an infested premises, which is quarantined as a precautionary measure to limit the spread of Panama disease tropical race 4

3 Background

At the time this document was prepared, there was a single confirmed detection of Panama disease tropical race 4 in a commercial banana plantation in north Queensland. This document will be reviewed and modified to incorporate any new information, as the situation develops and further information is acquired.

In response to the detection of Panama disease tropical race 4 in Queensland, on 4 March 2015 the Department of Agriculture and Fisheries (DAF) initiated an emergency response involving property quarantines and movement controls to contain the disease; and an extensive program of surveillance, tracing, sampling, diagnostic testing, education and awareness, and community engagement. DAF worked closely with the owners of the quarantined properties and the Australian Banana Growers’ Council (ABGC) to develop an agreed approach to manage the properties that enables operations to continue.

A workshop was held on 15–17 April 2015 that brought together directors and staff of the ABGC and DAF to develop a set of industry standards and guidelines for managing the risks posed by Panama disease tropical race 4. These standards and guidelines set out general conditions that need to be met by current and future infested properties in order for them to continue trade.

The workshop focused on four main areas of activity, which were to:

1. Identify the range of operations on properties infested with the disease that risk spreading the disease to other properties.
2. Confirm the risk mitigation practices that best address the risks of continuing banana production on premises infested with the disease.
3. Develop a set of minimum effective standards to guide on-farm biosecurity practices on infested premises.

4. Consider the conditions that may be imposed on infested premises to facilitate the movement of fruit to market.

The conditions of an Inspector's Approval for the movement of fruit from a quarantined property focus on the potential pathways for disease spread, such as the movement of people, equipment, vehicles, and so on. These conditions are legally enforceable, and reflect the standards developed through both the workshop process and detailed property-specific risk assessments. Record keeping, monitoring procedures, auditing, and the training and equipment needs of staff all need to be kept in mind when developing conditions. Biosecurity Queensland is always willing to consider equivalent risk-mitigation measures that may not be considered here, but which can be shown to be effective and workable on a quarantined property.

The guidelines and best practice information can be used by all banana growers to reduce the risk of the disease entering their property.

4 About the standards and guidelines

The following sections describe the minimum standards that will be required for quarantined properties to continue operating. Additional guidelines have also been provided to assist other banana growers to implement good on-farm biosecurity practices to help prevent the spread of the disease. These standards and guidelines have been listed under a range of typical farm practices to make them easier to find and use in normal farm operations.

Many of the standards and guidelines refer to the rigorous cleaning and decontamination procedures required to disinfect personnel, vehicles, machinery and other equipment in order to prevent the spread of the disease between properties or between blocks within a property. These cleaning and decontamination procedures are described elsewhere in the *Panama disease tropical race 4: Grower Kit* and are also available from the DAF website www.daf.qld.gov.au

5 General farm operations

5.1 Personnel movement

Standards

1. Use barriers and signage to restrict the movement of people within and off the quarantined property.
2. Establish zones to effectively manage the movement of people undertaking farm-based activities; there needs to be well-defined clean and dirty zones.
3. Provide wash-down facilities for decontamination between zones and for exit from a quarantined property.
4. Provide training for all personnel in decontamination and movement processes.
5. Establish a minimum number of entry and exit points to help control and monitor movement between zones, and on and off the property.

Guidelines

1. Exchange all boots and other footwear at the entry and exit points to all critical zones (e.g. the clean zone within a packing shed).
2. Provide dedicated footwear (e.g. gumboots) and clothing for all farm-based personnel and other regular visitors, including workers and contractors. It is preferable for provided clothing to be laundered on-site, otherwise contaminated clothing worn in dirty zones needs to be transported with care (e.g. in plastic bags) and laundered as soon as possible.
3. Provide boot scrubbing facilities with suitable tools (e.g. screwdriver or hoof pick and brushes), and disinfecting agents (examples include Sporekill[®] and Steri-max[®]) at several relevant points.
4. Restrict the entry of people outside the designated entry and exit points by using appropriate fencing to provide a physical barrier. Signage should be worded to exclude unauthorised people (e.g. tourists and hunters) from entering the property.

5.2 Vehicle and machinery movement

Standards

1. Vehicles and machinery should be clean on entry to and exit from the quarantined property.
2. Provide wash-down facilities in appropriate locations to enable a clean entry and exit following decontamination.
3. Use physical barriers to restrict the movement of vehicles and machinery to the designated entry and exit points on and off the quarantined property.
4. Farm-based vehicles and machinery should be prevented from leaving the quarantined property via a clean access road or from crossing a clean access road (the requirements for a clean access road are provided in Section 5.3).
5. Vehicles used for private or business administration purposes should not be driven into the farm's production areas, including banana production blocks, pasture or fallow areas (otherwise they will need to undergo vehicle decontamination).
6. Delivery vehicles should only access the quarantined property via the clean main access road.
7. Manage all vehicle movements, including deliveries, to ensure that clean zones (including public roads) are not contaminated.
8. The movement of vehicles and machinery should not contaminate public roads.
9. Keep a register of all vehicle movements for audit purposes, as required. This register should include vehicles used for private, domestic or business administration purposes.

Guidelines

1. The concept of 'come clean, leave clean' should be applied to the movement of people and machinery, where 'clean' means the same as 'decontaminated'.
2. It is preferred that farm-based vehicles and machinery should be used exclusively on a given property.
3. Any vehicles and machinery brought to a property by visitors or off-farm personnel (e.g. contractors, such as bell injectors or agronomists) should be subject to stringent decontamination procedures on entering or leaving a property, and when moving between different areas or zones within a property.
4. For a quarantined property, farm-based vehicles, machinery, and equipment may, in some circumstances, be 'floated' across public land (e.g. roads bisecting one or more quarantined properties) to an adjacent block or farm. Care will be required to ensure potentially contaminated material does not fall onto the public road or other clean areas during transit.

5.3 Roads and access

Standards

1. Construct roads and barriers to provide complete segregation of on-farm traffic within dirty zones and off-farm traffic within clean zones (e.g. the clean access road, the clean side of the packing shed, and any clean area associated with residences).
2. A clean access road providing access between public roads and the clean side of the packing shed and/or residence should be constructed and treated in such a way to be free from soil, mud or plant material, and to allow easy cleaning and decontamination. The road surface should be sealed (e.g. concrete or bitumen), or constructed from clean, heavy-grade gravel imported from outside the quarantined property, using clean machinery and equipment.
3. Clear the area immediately adjoining the clean access road so that infected or potentially-infected banana plant material cannot fall, wash or be blown onto the clean road. This may require the removal or relocation of banana plant rows adjacent to the road so that plant material cannot fall onto the road, and so that heavy rain cannot splash fungal spores from infected plants onto the road.
4. Construct the clean access road and the surrounding area so as to prevent water run-off from neighbouring fields flowing onto or over the road.
5. Incorporate a vehicle turning circle and parking area into the clean access road between the public road and clean side of the packing shed so that off-farm transport vehicles can only access the clean side of the packing shed.
6. Construct a fence along the clean access road to prevent the movement of vehicles, machinery and people between dirty zones and the clean road surface. Construct the fence so as to prevent the easy movement of people (e.g. a minimum of three plain wire strands, or

mesh). The fence should include the minimum number of designated entry and exit points, each equipped for decontaminating workers and vehicles.

7. Off-farm transport vehicles should only enter and exit the quarantined property via the clean access road, with the details recorded in appropriate registers (e.g. packing shed and wash-down facility).
8. Use of the clean access road by farm vehicles or foot traffic should not occur unless the vehicles or personnel have been thoroughly cleaned and decontaminated.
9. Construct any other farm roads that are used by farm equipment, workers and vehicles well away from the clean access road to reduce the risk of contamination (e.g. plant material, soil, mud, or dust).
10. Measures should be in place to prevent farm vehicles contaminating public roads with soil, mud or plant material. Suitable measures may include restricting farm vehicles to on-farm use, providing a limited number of access points with decontamination facilities, bridges, and/or roll-on roll-off systems.
11. Keep vehicle registers to present to an Inspector when requested.

Guidelines

1. Compacted, well-maintained roads reduce the risk of spreading the disease. While sealed surfaces are preferred (e.g. bitumen, concrete), a well-maintained gravel road may suffice in some circumstances.
2. When planning and maintaining access roads, take into consideration:
 - strategies for maintenance and decontamination,
 - strategies for water control, such as flow onto and across roads, and
 - the selection of road construction method appropriate for the conditions.
3. Access to a property residence may be achieved by extending the clean access road and clean zone, or by developing a second clean access road built to the same standards. Again, consider the concept of 'come clean, leave clean'.
4. While the fence around a clean access road is required to exclude people and vehicles, it may also incorporate other structural features to prevent the movement of animals, soil, and water.

5.4 Wash-down facilities

Standards

1. Establish wash-down decontamination sites at appropriate entries and exits to allow for vehicle and machinery access on and off a dirty area of the quarantined property, or for the movement of vehicles across or along a public road.
2. Decontaminate all off-farm vehicles at the wash-down facility every time they move from a dirty zone of the quarantined property to a clean zone.
3. When doing a wash-down, use a biodegradable detergent to remove soil and plant material, followed by a suitable disinfection agent.
4. The wash-down facility should be composed of ballast rock or a sealed pad within a controlled drainage area (CDA) to prevent the spread of the disease through overland flow of wash-down effluent or infiltrative movement of wash-down effluent into the soil.
5. The CDA should be of adequate capacity to prevent through-flow of water from surrounding areas (e.g. mounded earth, non-earthen bunding and so on).
6. Establish storage or disposal systems for wash-down effluent, such as a sump within the CDA, or evaporation ponds within the quarantined property.
7. Use clean water for wash-down and decontamination processes. Refer to Section 2 of this document for the definition of 'clean water'.
8. Decontamination of transport vehicles should be followed by appropriate decontamination of the wash-down facility.
9. Provide all personnel with training in decontamination procedures.
10. A record of wash-down and decontamination of vehicles should be kept in an on-farm register that includes all relevant details, including the vehicle registration number and description, date and nature of the cleaning, and who undertook the cleaning.

Guidelines

1. Effective wash-down and decontamination is an essential component of on-farm biosecurity. We recommend all farms implement the practices described in the Standards (above).

5.5 Fencing

Standards

1. Use an appropriate combination of fences, barriers and signage to prevent access by unauthorised vehicles and people to the production area of a property.

2. Construct a fence along a clean access road between any public road and the clean side of a packing shed to prevent the movement of vehicles, machinery and people between dirty zones and the clean road surface. Construct the fence so as to prevent the easy movement of people (e.g. a minimum of three plain wire strands or mesh). The fence should include only one designated entry and exit point, which is equipped for decontaminating workers and vehicles.

Guidelines

1. It is recommended that property owners construct a fence along the farm perimeter to manage access by feral or domestic animals to the property. This will also prevent the access of unauthorised vehicles and people, and will assist in the management of entry points for authorised vehicles and people.
2. A natural physical barrier (e.g. river) may be a viable alternative to fencing to control unauthorised people and vehicles.

5.6 Tools and equipment

Standards

1. Tools and equipment used by anyone on a quarantined property should be used exclusively on that property and retained there unless cleaned and decontaminated.
2. Clean and decontaminate all tools and equipment before and after use on a quarantined property, according to the specified procedure.
3. Record the use, inspection, cleaning and decontamination of all tools and equipment in a register.
4. Document all procedures for the use, inspection, cleaning, decontamination and tracking of all tools and equipment; all production workers should receive training on these procedures.

Guidelines

1. Wherever possible, farmers should use their own tools and equipment solely on their own properties. This will help prevent the spread of the disease between properties.
2. It is recommended that property owners minimise potential cross-contamination between clean and dirty areas or blocks by:
 - using tools and equipment on clean areas first, then using them on dirty areas or blocks,
 - having one set of tools and equipment for clean areas and a separate set of tools for dirty areas; the items to be used in the clean area should be stored separately from those used in the dirty area, and
 - thoroughly decontaminating all tools and equipment used in a dirty area or block in order to prevent the risk of spreading the disease to clean areas, and cross-contaminating clean and dirty tools and equipment.

5.7 Water supply, movement and disposal

Standards

1. The water source used in the packing shed and wash-down facilities should be free from Panama disease tropical race 4. It should be either:
 - water that has not come into contact with agricultural soil or banana plants (e.g. bore water, rain water that is collected directly into a tank, water derived from the MDIA distribution scheme), or
 - water that has been treated to destroy contaminating organisms (e.g. town water).
2. Manage the source of clean water for the packing shed and wash-down facilities to prevent contamination by contaminated water, soil, plant material, and so on.
3. Prevent overland water flows from reaching infested areas (e.g. through the use of bunding).

Guidelines

1. Property owners should use clean water for washing any equipment and tools, and for all activities in the packing shed. Clean water should be sourced from the following options:
 - town water
 - deep bore water
 - rain water collected from a clean roof
 - chlorinated water.
2. Irrigation equipment should not be recycled, although pumps may be decontaminated following appropriate procedures.
3. Bunding and evaporation ponds can be used to control overland water flow.
4. Property owners can also install sumps to control overland flow. The mud from these sumps may be transferred to waste at a later date.

Note: The use of groundwater is regulated in certain management areas within the Wet Tropics Water Resource Plan (<https://www.dnrm.qld.gov.au/water/catchments-planning/catchments>). If a property owner wishes to use bore water on a property within a groundwater management area, contact the Department of Natural Resources and Mines to discuss any requirements or limitations.

- For Wet Tropics – phone 1800 232 454 or email WRPWetTropics@dnrm.qld.gov.au.

5.8 Waste management

Standards

1. Dispose of all waste material (leaves, bells, discarded fruit, pseudostem material, bunch stalks, bunch bags, string, decontamination water, soil and mud) in a way that does not spread the disease from the quarantined property.
2. Dispose of unusable and contaminated bunch bags and string as contaminated waste (i.e. by deep burial within the farm boundary or by suitable commercial waste contractors). The method of disposal should comply with all applicable legislation and regulations, including local government by-laws (contact your local government authority/council).
3. Plant material waste (including weeds) should not leave the quarantined property.
4. Keep a register of deep burial sites (e.g. location, date and types of waste).
5. Keep invoices as evidence of waste disposal.

Guidelines

1. Because plant material can spread the disease, leave any pruned plant material in the paddocks of origin.
2. Dispose of waste on-site in a location where it can't be accessed (e.g. dug up) by animals, but also where it is unlikely to be inundated with water and subsequently enter a waterway, a neighbouring property, or the water table. For example, deep burial on high ground would be better than deep burial on low ground where the burial site could become saturated.
3. Mulching can be undertaken to reduce the physical size of the material but the products should not be used as mulch, soil additives or fertiliser. In addition, its attraction for wildlife and feral animals, for example birds, pigs, and so on, should be controlled.
4. Any inorganic waste produced on-farm should be processed by commercial or industrial waste contractors for disposal in accordance with all relevant legislation and regulations.

5.9 Farm-based animal movement

Standards

1. Manage farm-based animals (e.g. dogs) to prevent the spread of the disease via soil and plant material, for example, by excluding them from dirty areas or blocks.
2. Manage feral animals (e.g. pigs), native animals (e.g. kangaroos, wallabies, rats and birds), and insects (e.g. weevil borers) to limit the spread of the disease.

Guidelines

1. It is recommended that the movement of livestock on or from mixed-use farms is carefully managed to avoid potential cross-contamination.
2. Farm perimeter fencing is recommended to prevent the spread of the disease on the hooves, trotters, coats, and so on, of feral, native or domestic animals, to or from farm or production areas. Please refer to Section 5.5 for more information on fencing.

6 Crop production

6.1 Land preparation

6.1.1 Earthworks and removal of previous crops

Standards

1. Soil movement and dust dispersal should be managed so that the disease is not spread from the quarantined property.
2. Keep farm-based vehicles either on the quarantined property, or decontaminate them each time they are to leave the property. Tools and equipment used by anyone on the quarantined property should remain on the property, unless cleaned and decontaminated. Keep a register on the quarantined property, and record in it all the details about the use, inspection, maintenance, cleaning and decontamination of all tools and equipment.
3. Document the procedures for the use, inspection, maintenance, cleaning, decontamination and tracking (including disposal) of tools and equipment; all production workers should receive training on these procedures.
4. Keep a record of who is trained in what procedures, and when that training took place.

Guidelines

1. On-farm practices should minimise soil movement and dust dispersal. Particular care should be taken on windy or wet days when people and traffic movement exacerbates the spread of dust and mud. Measures that can be used include:
 - minimising the use and movement of contractors,
 - planning earthworks to use only farm-based equipment where possible,
 - exercising the concept of 'come clean, leave clean' for all machinery movements,
 - undertaking major earthworks at times of year that minimise soil movement, and
 - driving farm machinery at speeds that minimise dust.

6.1.2 Sampling and soil testing

Standards

1. Samples of soil should not be removed from the quarantined property for testing or any other purpose, without an Inspector's Approval. Where an Inspector's Approval is provided, the sampling and removal of soil from the quarantined property should be undertaken by a professional (e.g. a plant pathologist or a trained Inspector) and be supervised by an authorised Inspector.

6.1.3 Irrigation installation

Standards

1. Keep farm-based vehicles on the quarantined property, or have them undergo decontamination each time they are to leave the property. For further information see Section 5.1 (Personnel) and Section 5.2 (Vehicles).
2. Minimise soil disturbance during installation.

Guidelines

1. The use of second-hand irrigation equipment is discouraged, unless it is known to have never been in contact with banana production, or it has been thoroughly decontaminated.

6.2 Planting

6.2.1 Soil movement

Standards

1. Manage soil movement to minimise spread of the pathogen between blocks within the farm or off the quarantined property to other farms.
2. Keep farm-based vehicles on the quarantined property, or have them undergo decontamination each time they are to leave the property.

Guidelines

1. Consider options to minimise soil disturbance and movement (e.g. planting cover crops, timing activities to reduce dust and mud movement).
2. Barriers and fences (e.g. sediment control fence) can be considered as an option to reduce soil contact.
3. Having on-farm vehicles that do not leave a property will reduce time and financial costs associated with repeated decontamination onto and off the property.

6.2.2 Plant material movement

Standards

1. A quarantined property should never be used as a source of planting material.
2. An Inspector's Approval is required for the movement of all banana plant material onto and off a quarantined property.
3. Only certified disease-free material should be used for planting (e.g. sourced from QBAN-accredited suppliers).

4. Plant material should not be moved for sampling and testing without an Inspector's Approval and without supervision by an Inspector.
5. Any Inspector-approved plant sampling should be undertaken by qualified personnel (e.g. a plant pathologist, a trained Inspector, or an agronomist) and be supervised by an Inspector to ensure sample selection, collection and packaging is done in a way that maximises sample integrity, while preventing any accidental contamination of the environment while in transit.

Guidelines

1. It is not recommended that bits and suckers from other banana farms are used as a source of planting material.

6.3 Crop production

6.3.1 Irrigation

Standards

1. Dam water contaminated with overland flow from an infested property or block should not be used for irrigation.
2. Keep farm-based vehicles on the quarantined property, or ensure they undergo decontamination each time they are to leave the property.

Guidelines

1. A dam restricting overland flow (e.g. turkey's nest dam) and made from clean materials filled with rainwater or delivered water can be used for irrigation
2. Ideally, irrigation activities should be carried out by vehicles that remain on the quarantined property. Having such vehicles will reduce time and financial costs associated with decontamination, which is required every time a vehicle leaves the quarantined property.

6.3.2 Fertilising

Standards

1. Farm-based vehicles should either remain on the quarantined property, or undergo decontamination each time they are to leave the property.
2. If contractors are used to spread fertilisers, fully inform them about the restrictions that apply and ensure they are trained in decontamination procedures.

Guidelines

1. Ideally, fertilising activities should be carried out by vehicles that remain on a property. Having such vehicles will reduce time and financial costs associated with decontamination, which is required every time a vehicle leaves the property.

2. Consideration should be given to how fertiliser is delivered onto a property and the subsequent decontamination of the delivery vehicle on entry and exit to the property. Property managers should aim for it to be done in a way that minimises the amount of equipment or vehicle area that needs to be decontaminated. For example, it may be possible for fertiliser to be delivered in bags to a clean area and from there distributed via a (decontaminated) on-farm vehicle.

6.3.3 Weed control

Standards

1. Keep farm-based vehicles used for weed control on a quarantined property or have them undergo decontamination prior to leaving the property. Having dedicated on-farm vehicles will reduce time and financial costs associated with repeated decontamination.
2. Soil movement or field dust dispersal should be managed so that the disease is not spread from the quarantined property.

Guidelines

1. Some weeds can host the disease without displaying symptoms and, therefore, may also present a risk. They need to be treated the same way as other plant material.
2. Alternative known weed hosts of the disease include:
 - *Chloris inflata* (Purpletop Rhodes grass)
 - *Euphorbia heterophylla* (milk weed)
 - *Tridax procumbens* (coat buttons, Mexican daisy)
 - *Cyanthillium cinereum* (Vernonia, iron weed)
 - *Paspalum fasciculatum* (Mexican crown grass)
 - *Panicum purpurascens* (syn. *Urochloa mutica*, Para grass)
 - *Ixophorus unisetus* (foxtail millet, Mexican grass)
 - *Commelina diffusa* (native wandering Jew, scurvy weed).
3. Perform weed control in conditions that minimise the possibility of soil and dust dispersal. Avoid windy and wet days when people and traffic movement will exacerbate the spread of dust and mud.

6.3.4 Plant management

Standards

1. Tools and equipment used by workers should be used exclusively on a quarantined property and retained on the property unless they are cleaned and decontaminated.
2. Keep a register on the quarantined property recording the dates and nature of use, inspection, cleaning and decontamination of harvest tools and equipment.

3. Document the procedures for the use, inspection, cleaning, decontamination and tracking of tools and equipment; all production workers should be provided with training in these procedures. Keep an on-site register of training that sets out what training was provided, who provided it, who received it, and when it took place.
4. Clothing, footwear and equipment of workers involved in these operations should be:
 - cleaned or laundered on the quarantined property, or
 - decontaminated prior to leaving the quarantined property.

Guidelines

1. Consider having farm-based equipment and clothing for regular activities and personnel used permanently on-site. If this is not possible, consider decontaminating all tools, equipment and clothing onto and off a property.

7 Fruit movement

Banana fruit may be permitted to be moved off a quarantined property provided the following conditions have been met:

7.1 Fruit harvest

Standards

1. Fruit must not be harvested from infected plants (which will be destroyed on quarantined properties), or from suspect plants.
2. Fruit must not be harvested from declared infested areas.
3. Tools and equipment used by workers on a quarantined property should be used exclusively on that property and retained there, unless cleaned and decontaminated according to the specified procedures.
4. Thoroughly clean and decontaminate tools and equipment used by workers for harvesting activities prior to each day's work.
5. Keep a register on the quarantined property recording the dates and nature of use, inspection, cleaning and decontamination of harvest tools and equipment.
6. Document the procedures used when inspecting, cleaning, decontaminating and tracking harvest tools and equipment for training purposes; provide all production workers with training on these procedures. Keep an on-site register of training that sets out what training was provided, who provided it, who received it, and when it took place.
7. Leave bunches that come into contact with the ground, or are otherwise contaminated with field soil, in the field.

8. Dispose of unusable bunch bags and string as contaminated waste (e.g. by deep burial within the farm boundary or by suitable commercial waste contractors). There should be a register of deep burial sites and the method of disposal should comply with all applicable legislation and regulations.
9. Remove leaves and pseudostem material from bunches and leave these in the field.
10. Bunch trailers should be free of leaves before leaving the harvest block.
11. Workers should not contaminate trailers with soil, mud and plant waste.
12. Harvested fruit should only be delivered to the dirty side of the packing shed.
13. Appropriate strategies should be used to ensure that public roads do not become contaminated with soil or plant material from quarantined properties.

Guidelines

1. Pickers should avoid contaminating trailers with soil or plant material from dirty areas (i.e. they should stand on running boards or equivalent, rather than on the floor of the trailer).
2. Transport fruit to the packing shed in a manner that reduces the potential to spread the disease (e.g. by driving at speeds that minimise dust).
3. The use of leaves for protection of bunches in trailers should not be allowed.
4. Transit of people or vehicles across the property should not be allowed.
5. The potential risks of spreading the disease associated with transit of harvested fruit to a packing shed via public roads (if necessary) needs to be carefully managed.

7.2 Fruit packing and packing shed

Because all properties have different infrastructure and processes, conditions specific to individual properties will be set out in the Farm Biosecurity Management Plan for that property.

Standards

1. Delineate the packing shed into clean and dirty zones, ideally at the point of fruit cleaning.
2. Do not move any risk items, apart from fruit, from the dirty side to the clean side of the packing shed, unless it is decontaminated.
3. Maintain one-way traffic of fruit through the packing shed to ensure washed fruit and dispatch materials associated with clean fruit remain segregated from dirty material, and that no backward movement of fruit or materials occurs along the processing chain.
4. When bunches arrive at the packing shed, remove them from the bunch bags, and hang the fruit as per usual for processing.

5. Uncontaminated bunch bags may be re-used.
6. Contaminated bunch bags and string should be cleaned to remove any soil and plant material, or they can be disposed of as waste (e.g. by deep burial within the farm boundary). The method of disposal should comply with all applicable legislation and regulations.
7. Use clean water only in the clean part of the packing shed. Clean fruit to remove all soil and plant material. Refer to Section 2 for a definition of 'clean water'.
8. Dispose of discarded plant material (e.g. fruit, and stems) as contaminated waste.
9. Pack de-handled fruit into new cartons or clean returnable crates, free from soil and plant material, in accordance with standard commercial practice. Label crates with the facility's name and address.
10. Packed cartons should not touch the floor of the packing shed, and should be packed directly onto clean pallets that do not come into direct contact with the packing shed floor, other than within a clean area.
11. The facility should have a clean hard stand for loading, free from soil and plant material.
12. The fruit transport vehicle should take a clean access road to the clean side of the packing shed.
13. The abovementioned clean access road should be a hard stand and be free from soil or plant material. Refer to Section 5.3, Roads and Access, for more information.
14. If the driver exits their vehicle they should undertake a decontamination process (e.g. a foot bath) before re-entering the cab of their vehicle.
15. Upon arrival and before departure from the quarantined property, the interior of transport trucks should be inspected and found to be free from soil or plant material.
16. Keep a register of fruit consignments, as loaded out of the packing shed (i.e. pallets per load, or similar), including the time and date of loading, the registration number of the vehicle (or other identifying number), the driver's details (name, company), and so on.
17. All deliveries intended for use on the clean side of the packing shed should be delivered to, and stored in, the clean side of the shed.
18. Manage any vermin inhabiting the packing shed.

Guidelines

1. Compacted, well-maintained roads will reduce risk of the disease spreading, although a sealed surface is preferred because of easier cleaning and decontamination, and lower maintenance costs over the longer term.
2. Equivalence for alternative systems that appropriately manage the risks could be considered (e.g. food safety requirements and vermin control compliance).

3. Cleaning and decontamination procedures are described elsewhere in the *Panama disease tropical race 4: Grower Kit* and are also available from the DAF website www.daf.qld.gov.au. Fruit should be directly consigned to the next stage in the supply-chain, for example, to ripening, wholesale or retail facilities (e.g. central markets, supermarket chains, distribution centres).



For more information visit
www.biosecurity.qld.gov.au
or call 13 25 23.