



Department of  
**AGRICULTURE  
 FISHERIES &  
 FORESTRY -  
 AUSTRALIA**



## **Philippine bananas Import Risk Analysis Outcomes of a meeting between the Philippines, Biosecurity Australia, the risk analysis panel and technical working groups**

Canberra, 10-11 April 2002

### **Participants:**

Sharan Singh	(Chair) risk analysis panel & TWG1
Rob Allen	Risk analysis panel – QDPI
Bob Paton	Risk analysis panel – NSW Ag.
David Peasley	Risk analysis panel – Peasley Horticultural Services
Ron Peterson	TWG1 – QDPI
Chris Hayward	TWG1
Mike Robbins	Risk analysis panel - AQIS
Mary Harwood*	Executive Manager, Biosecurity Australia
Brian Stynes*	General Manager, Plant Biosecurity
Bill Magee*	Senior Manager, Biosecurity Australia
Sam Beckett*	Biosecurity Development and Evaluation
Gavin Edwards	Technical Secretariat, Biosecurity Australia
Dr Rene Rafael C. Espino	Program Director, Philippine Dept. Agriculture
Ms. Estrella D. Tuazon	Chief, Philippine Plant Quarantine Service
Mr Francisco X. Lorenzo	PBGEA
Dr Edwin S. Raros	Stanfilco (Division of Dole Philippines)
Dr Rodolfo A. Paningbatan	Del Monte Fresh Produce
Dr Vivencio Quinñon	Tagum Agricultural Development Company, Inc.
Mr Arturo Boncato	Agricultural Consultant
Dr Emily Fabregar	Lapanday Group of Companies
Ms Leah Ruiz	First Secretary, Philippine embassy
Dr Maria Araceli E Albarece	Agricultural attaché, Philippine embassy

\*Attended part of the meeting only.

**Apologies:** John Thomas, Bryan Cantrell, Gordon Guymer, Bruno Pinese.

### **Outcomes:**

#### **Opening remarks**

The Chair welcomed members and briefly summarised the agenda items for the meeting.

#### **Philippines presentation – banana industry practices and experiences with export markets**

Mr Lorenzo gave participants a presentation on banana industry practices and experience in the Philippines. The presentation provided an overview of the entire

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banana production/marketing industry, from planting tissue cultured plants in the field to the export of fruit into external markets.

Some issues/facts that were identified and clarified during the presentation are summarised as follows:

- The Philippines is the fourth largest banana exporter in the world, and the market leader in Asia.
- Bananas are the Philippines' second most important agricultural export commodity (following coconuts).
- The Williams Cavendish banana variety grown in the Philippines was originally selected in Australia.
- Pressure from pests and diseases is significantly less in highland areas than in lowland areas. The highlands are cooler and generally experience much less rainfall and humidity than the lowlands, and associated bunch filling times are extended accordingly (18 to 20 weeks in the highlands as opposed to 10 to 13 weeks in the lowlands).
- 50% of Dole plantings in the Philippines are based on annual cropping, with a target of 100% being based on this cropping regime by 2005.
- Approximately 90% of planting material in the Philippines is derived from tissue culture techniques. Some of the stock is virus indexed, whereas other stock is obtained from superior mother plants.
- Bunches (or associated plants) displaying any sign of disease in the field are not selected for harvest.
- The total area devoted to Cavendish banana plantation in the Philippines is 30 000 hectares.
- The Cavendish banana industry in the Philippines employs 40 000 workers directly and benefits 160 000 Filipinos indirectly.
- There is very little local demand for Cavendish bananas, with 90% of Cavendish fruit being exported into foreign markets.
- Banana fruit are only harvested in the hard green condition. Any bunches with fruit that are showing evidence of premature ripening or yellowing are rejected from being harvested.
- Cartons used for export fruits range from 5 to 18 kilograms, with 13 kilograms being the carton of choice. There are 54 x 13 kilogram cartons per pallet.
- Lowland growers use cableway systems to move banana bunches from the field to packhouses. Highland producers use mobile packing stations. The average cableway is 400 metres in length, however, some are as long as 2000 metres. Bunches remain separated on the cableway system. Any bunches that may accidentally fall to ground during transportation are discarded.
- In some instances fruit may be dehandled in the field. Trays are used to transport the hands to the packinghouse, and the fruit may be exposed to water and airborne inoculum, as well as dust and trash. It is estimated that 10% of fruit is dehandled in the field and transported on trays.
- For the specialised organic market in Japan, specialised padded stretchers are used to carry dehandled bananas from the fields.
- All packing houses are under roof. However, the Australian delegation raised the possibility of exposure of fruit to wind driven rain, dust and trash.
- The use of mobile packinghouses is increasing in Philippine plantations, with a target of 40% of fruit being packed in these units.
- Packhouse staff are specifically trained and operate in accordance with standard operating procedures at major packhouses.

- Three types of trucking systems are used to transport packed fruit—break bulk, palletised, and refrigerated palletised. Tarpaulins are used on all non-refrigerated vehicles to cover loads and protect packed bananas from rain, dust etc.
- Shipping systems used vary depending on the market. Fruits are either loaded palletised or as break bulk into refrigerated ships or refrigerated container vans. During shipping, fruit are maintained at a constant 13°C.
- Shipping times vary depending on the market: 6 days for Japan, 8 days for China. It is estimated that shipping time to Sydney would be between 10 to 14 days.
- Depending on demand, it is envisaged that should access of Philippine bananas be permitted into Australia, cartons will be palletised and transported in refrigerated vessels.
- If access for Philippine bananas is permitted, distribution of fruit in Australia will use existing infrastructure.
- While individual companies may have made investigations into projected market penetration of the Australian market, the Philippines as a whole has not undertaken any form of market research. A rough estimate of expected initial exports to Australia would be 1 vessel per week, which would equate to 7 million cartons per year. Inspection for containerised shipments are done in packinghouses. Break bulk, palletised shipments for the refrigerated vessels are done in the wharf.
- The Philippine Bureau of Plant Industry undertakes quarantine inspections of all export fruit. Inspection is predominantly undertaken at the packhouse, but may also be undertaken at the wharf as needed. At this time there are no plans to inspect exported fruit at the wharf.
- Banana industry standards in the Philippines dictate that all export fruit must be shipped within 24 hours of harvest. In practice it is found that fruit are shipped within 15 to 18 hours of harvest.
- Although there is a small domestic banana industry in southern China, quarantine requirements for imported bananas from the Philippines are based solely on the hard green condition and inspection. Japan, on the other hand, which has no banana industry, requires hydrogen cyanide fumigation of infested fruit as well as the hard green condition and inspection. For the New Zealand market all wooden pallets are fumigated with phosphine at a concentration of 48g/m<sup>3</sup> for 72 hours.
- All bags used on fruit in-field in the Philippines remain on a plantation after use and are eventually recycled into products such as posts and footbridges. By this time it is believed there are no insecticidal residues remaining in the plastic.
- An individual farming area is considered to be a 200 to 300 hectare area around a packhouse. Due to distance constraints the packhouse only packs fruit from this area.
- In commercial plantations, all banana plants are inspected on a weekly basis. Any plants showing symptoms of Moko disease are eradicated. Pest and disease pressures are noted, and chemical sprays/cultural practices are used to keep pests at low numbers.
- It is common practice in commercial Cavendish banana plantations to remove male flower buds on a routine basis. Buds are broken off by hand.
- Chlorine concentration used in the packhouse fruit dip treatment is 200ppm (of the product) or 20ppm available chlorine (active ingredient) and the alum concentration in the dip is 200ppm. A system of maintaining the chlorine concentration has been developed (using colorimetric procedures) in which the number of boxes of fruit that can be passed through the dipping solution within a given period is predetermined.

Areas of uncertainty for various quarantine concerns (includes agenda item “technical discussions concerning export fruit pathways and ‘unrestricted’ risk”)

#### a) Pathogens

##### *Moko disease*

Participants discussed quarantine concerns about Moko disease in the context of TWG report summary methodology. This exercise highlighted gaps in knowledge about the biology and epidemiology of Moko disease. During the discussion the following points in relation to Moko disease were noted:

- Banana bags may be cut or accidentally torn when calibrating fruit in the field. Bags are left on the bunches during transport to the packing station.
- All bags, except those used in Bukidnon, are open at the bottom.
- Fruit does not touch the ground at any time between harvest and packing. If a bunch is dropped on the ground (either from manual handling or transport on the cableway) it is rejected for export as the fruit is inevitably damaged.
- Padding on trailers is changed as often as possible to remove latex.
- Roads within plantations must be maintained in good condition, as muddy, bumpy roads will inevitably lead to fruit damage. Wheeled vehicle usage is limited to access roads.
- Trailer transport in the field will not be used for export fruit.
- An average of 38 000 gallons of water flows through packhouse tanks per day.
- Upon arrival at the packhouse, bunches are dehanded into the same dipping tank. Any bunches that display signs of premature ripening or yellowing are not dehanded and are immediately rejected.
- Minimum dip time for fruit in chlorine/alum solution is 25 minutes.
- During packing, any hands that demonstrate signs of premature ripening or yellowing of fruit are rejected.
- Fruit remains moist after the dip treatment in the partially vacuum-sealed bags. It is thought that chlorine will become inactive quite quickly but alum (being a bactericide) will remain active for a longer period of time.
- If the partially vacuum-sealed bag were to rupture during transit, fruit will arrive at the destination in a soft green condition and will be rejected.
- It is believed that the *Ralstonia solanacearum* bacterium, in a compost/rubbish dump environment, would compete very poorly with fermenting organisms. This may be demonstrated through future research activities.
- Moko disease has been detected in two banana plants in a recently established 250 hectare plantation at Bukidnon.
- Infected fruits have never been detected in commercially grown Cavendish bananas in the Philippines.
- Heliconias, which are alternate hosts of Moko disease, exist around some Cavendish banana plantations in the Philippines.

It was suggested by the RAP that research is needed into the transmission and latency of Moko disease. Issues around Moko disease biology/epidemiology that require investigation were listed as follows:

1. The transmission of inoculum from native and backyard banana plants to plantation Cavendish banana plants.
2. Symptomatic and asymptomatic infection of banana peduncles, crowns and fruit, including the time taken for the infection to spread through the peduncle into the crown/fruit.
3. Survival of bacterium on the surface of fruit with/without commercial chlorine/alum dip treatment.
4. Survival of bacterium on the fruit when encapsulated in ooze/latex.
5. Occurrence of bacteria in floral ends.
6. Survival of bacterium in/on waste (skin, crown tissue and fruit).

The group believed that issues 1, 2, 3 and 6 above are the most important, and should be given the highest research priority. Protocols 4 and 5 are less important and should be given a lower research priority.

In developing scientific protocols for research into these issues the following factors need to be considered:

- Temperature/climatic differences between lowland and highland plantations.
- Only the common cultivar Grand Nain may need to be tested. The need of testing other Cavendish cultivars was also discussed.
- Dilution of inoculum will need to be considered. Inoculum volumes will need to match volumes expected to be carried on small and large insects, cutting implements and human hands. It was considered that a range from 10 nanograms to 100 micrograms would be appropriate for these trials.
- Strains of bacterium used. It was thought that strains from both native and cultivated plants should be used.
- The experiments must be repeatable and appropriate replication must be used.
- The experimental results should demonstrate the frequency that events occur.

*Action:* It was agreed that the RAP will propose research protocols to investigate the issues listed above and the Philippines will consider the protocols. The RAP will assist in the development of research protocols. Development of these protocols will be coordinated by Biosecurity Australia through Brian Stynes.

*Action:* Philippines to forward information to RAP including circumstances surrounding the first detection of Moko disease in new banana plantations.

### ***Black Sigatoka***

It was generally agreed by the group that the disease is endemic in the Philippines. It is possible that airborne spores and leaf trash could contaminate fruit through ventilation holes and cuts in the bags.

Black Sigatoka is the main disease present in commercial Cavendish plantations. Where control measures are not used, the disease is very severe. However, fungicides are part of the integrated management of black Sigatoka in commercial Cavendish plantations.

The efficacy of methyl bromide fumigation to decontaminate pallets was also discussed. The Australian delegation raised the issue that higher doses of methyl bromide maybe required to mitigate fungal pathogens, particularly fruiting bodies embedded in trash.

### ***Freckle disease***

The causal organism of freckle disease, *Guignardia musae*, can occur in mature fruit. The incubation period for this organism is variable, being from 20 to 60 days. It is possible that airborne spores and leaf trash could contaminate fruit through ventilation holes and cuts in the bags.

While there are intensive management programs for black Sigatoka, bunchy top and Moko diseases, there are no specific programs aimed at freckle. It is understood that management procedures for black Sigatoka are effective in controlling freckle.

More than 45 applications of fungicide sprays may be applied to plantations in coastal lowlands per year.

*Action:* Philippine BPI to forward information about freckle disease to the RAP through Biosecurity Australia.

### ***Bract mosaic virus***

Philippines indicated that this disease is common in Saba bananas, but is never found in commercial banana plantations during survey. It is believed that the existing control policy for aphids (which maintains aphid populations at a very low level) in cultivated plantations has effectively excluded bract mosaic virus. Experiments on the transmission and epidemiology of this disease are currently being conducted in the Philippines—the protocols for this research will be forwarded to the RAP through Biosecurity Australia.

*Action:* Philippine BPI to forward bract mosaic virus research protocols to Biosecurity Australia.

### ***Bunchy top virus***

This disease has a major impact in commercial Cavendish banana plantations in the Philippines.

#### **b) Arthropods**

It was noted by the RAP that there was a general lack of detailed data available for fruit flies, peel scarring weevils, hard scales and mealy bugs in banana plantations in the Philippines. It was generally understood, however, that peel scarring weevil distribution was limited to the highland growing region in the Philippines, and the presence of these pests on bagged banana bunches would be very low.

### ***Fruit flies***

No work has been undertaken in the Philippines to demonstrate that hard green bananas are a non-host of endemic fruit flies. However, the Philippine delegates believe that work undertaken in Hawaii in 1996-1997 on the host status of hard green bananas for export to continental United States of America can be extrapolated to cover Philippine fruit flies.

### ***Hard scales***

Interception data from Japan and New Zealand show regular interceptions of *Aspidiotus excisus* on Philippine bananas entering these countries.

### ***Mealy bugs***

It was noted by the group that there is a lack of information about the prevalence of three species of *Dysmicoccus* (particularly *D. neobrevipes*) in Philippine banana plantations. The Philippine delegates believe that current plantation management techniques are suitable for maintaining these mealy bugs at very low levels in Philippine plantations.

The RAP disagreed with this assumption on the basis of interception reports from New Zealand, and believes these interception reports indicate system problems in Philippine plantations. Although treated bunch covers and insecticidal sprays are used, there are detections of mealy bugs on Philippine bananas at the New Zealand border on a weekly basis. It was, however, uncertain whether the mealy bugs being intercepted are all viable.

It was not thought that the chlorine and alum disinfectant used in the dip tanks would be effective against either the crawler or adult stages of mealybugs. Cross contamination of fruit by crawlers could occur in the dip tanks, but may be unlikely as it would depend on the crawlers randomly floating onto fruit.

Procedures are in place in packhouses to remove mealybugs from hands/bunches. This involves physically brushing or scrubbing the mealybugs from the fruit. It was thought that visual detection of adult mealybugs between banana fingers would be difficult, and visual detection of crawlers almost impossible.

Discussion on the effectiveness of vacuum packed plastic bags in banana cartons on arthropod mortality took place. It is thought that under partial vacuum conditions, rising carbon dioxide levels resulting from fruit respiration may have a deleterious affect on the non-egg stages of living arthropods. However, it was noted that New Zealand were intercepting live insects in vacuum packed bananas.

### **c) Horticulture, environment and operations**

The Philippines delegates clarified a number of issues raised by the RAP. These clarifications are included below:

- In Philippine Cavendish banana plantations there is approximately 0.8 to 1 labourer per hectare.
- A banana plantation in the Philippines is roughly defined as a “contiguous area managed by one manager”. The size can range from 70 to 6250 hectares. A minimum of 35 tons of exportable fruit are produced per hectare per year.
- Tourists are permitted entry into Philippine banana plantations, but only under strict supervision. Plantations are generally not found in tourist areas.
- All Cavendish banana plantations in the Philippines have adopted a form of the ISO9002 certification system. The more wealthy plantations are certified under the ISO9002 standard, while the less wealthy plantations are certified under the ISO9002 government alignment

version of the standard. Plantations operating under both systems are audited by an external auditor on a 6-monthly basis, and by an internal auditor on a 3-monthly basis.

- Some Cavendish banana plantations in the Philippines operate in accordance with the SQF2000 certification standard.
- Some Cavendish banana plantations in the Philippines operate under the ISO14001 accreditation system for environmental compliance. All new plantations in the Philippines must be covered by an environmental compliance certificate.
- While some plantations in the Philippines monitor waterways for adverse environmental conditions, this is not mandated by Philippine legislation. The Fertilizer and Pesticide Authority conduct monitoring of waste water.
- Residue testing on fruit for pesticides is only undertaken on demand by the importing country. MRLs must be within acceptable levels as set out in Codex Alimentaris international standards.
- There is a limited transfer of plantation equipment or employees between plantations in the Philippines.
- There has never been an interception of hitchhikers (such as frogs, rodents, geckoes, lizards and snakes) on bananas exported from the Philippines. It is believed that if any such hitchhikers were present in banana bunches in the field, they would not remain on the fruit after the de-handing, scrubbing and dipping process. Further, there are no climbing frogs endemic to the Philippines.
- The Philippine delegates believe that due to short turn around times of containers in the Philippines there is very little chance of giant African snails being found on containers as hitchhikers.
- Some plantations in the Philippines use herbicides (such as Roundup®) to control weeds along roadsides. The common practice is to slash the weeds rather than use herbicides.

*Action:* The Philippine delegates will provide “in-confidence” copies of audit reports to the RAP, showing non-conformities and the resultant corrective actions, for small, medium and large plantations.

*Action:* Philippines to provide climate data (including average temperature and rainfall) for the banana producing regions of Cotobato and Bukidnon.

*Action:* Philippines to provide a copy of a completed environmental compliance certificate from Bukidnon.

#### **Banana IRA methodology**

Sam Beckett provided participants with an overview of the IRA methodology as it applies to the Philippine banana IRA. Much discussion took place on likelihood scenarios and the concept of evaluating unrestricted risk.

#### **Next steps for the IRA**

Mary Harwood discussed the next steps for the IRA with the group. Issues such as stakeholder comment periods and IRA endorsement authority were discussed.