



Department of
AGRICULTURE
FISHERIES &
FORESTRY -
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PLANT BIOSECURITY POLICY MEMORANDUM 2002/08

IMPORT RISK ANALYSIS – IMPORTATION OF BANANAS FROM THE PHILIPPINES

This Plant Biosecurity Policy Memorandum (PBPM) updates stakeholders on the Import Risk Analysis (IRA) on Bananas from the Philippines.

Since the stakeholder workshops in October 2001, the three technical working groups (TWGs) - pathogens; arthropods; and horticulture, environment and operations - have been preparing draft technical reports for risk analysis panel (RAP) consideration.

The RAP and TWGs will meet in Canberra on 7 and 8 March 2002 to plan completion of the draft reports by the end of March. The draft reports will then be sent to stakeholders, who will have 30 days to comment.

The TWGs will finalise the reports, taking into account stakeholder comments. The RAP will use the reports to prepare the draft IRA report.

Stakeholder meetings

The RAP plans to meet with stakeholders in the period between the release of the draft technical reports and the draft IRA report. It intends to hold one or two meetings to discuss the technical issues of interest to stakeholders. We will advise meeting dates and venues when they are confirmed, and stakeholders will be welcome to raise any technical issues with the panel at those meetings. We would encourage stakeholders to have their technical advisers at these meetings.

Philippines meetings

Two Biosecurity Australia officials met with counterparts and industry technical experts in Manila on 18 and 19 February 2002 to discuss technical issues related to Australian IRAs on Philippine tropical fruit, including bananas.

Two requests for additional technical information relating to the Philippine Banana IRA (see attachments 1 and 2 to this PBPM) were discussed. The Philippines Bureau of Plant Industries has undertaken to forward the information as soon as practicable.

Biosecurity Australia has invited Philippine technical experts to Canberra to further discuss and clarify technical issues concerning the banana IRA with TWG and RAP members. We expect this meeting will be held in the last week of March.



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Information relevant to the IRA

It is important that stakeholders who have information which may be relevant to the Philippines banana IRA provide that information as soon as possible. We wish to ensure that such technical information is available to the TWG's and the RAP at this important stage in the risk analysis.

Confidentiality

Respondents are advised that, subject to the *Freedom of Information Act 1982* and the *Privacy Act 1988*, all submissions received in response to Plant Biosecurity Policy Memoranda will be publicly available and may be listed or referred to in any papers or reports prepared on the subject matter of the memoranda.

The Commonwealth reserves the right to reveal the identity of a respondent unless a request for anonymity accompanies the submission. Where a request for anonymity does not accompany the submission the respondent will be taken to have consented to the disclosure of his or her identity for the purposes of Information Privacy Principle 11 of the Privacy Act.

The contents of the submission will not be treated as confidential unless they are marked 'confidential' and they are capable of being classified as such in accordance with the Freedom of Information Act.

Consultation

If you wish to suggest inclusion of an additional stakeholder in our distribution list for this IRA, or if you wish to be removed from the distribution list, please provide details to Technical and Administrative Services at the address below.

Information on all IRAs being conducted by Plant Biosecurity is available on the web at <http://www.affa.gov.au/plantbiosecurity>.

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RAP's request for further information from the Philippines

The Risk Analysis Panel (RAP) on Philippine bananas would like further clarification on the following questions that the Bureau of Plant Industry (BPI) responded to in October 2001 (available on the AFFA website at www.affa.gov.au/plantcra). The RAP will shortly ask the Philippines for more information for use in import risk analysis models for specific quarantine pests.

Question 4

What proportion of plants in various plantations is inspected on a weekly basis? Do specialists, e.g., entomologists, plant pathologists and agronomists accompany survey teams at each inspection?

Question 5

According to the BPI response, the Philippines use "area freedom" for managing banana pests. Please provide a list of banana pests that are managed by area freedom arrangements. Is area freedom used to control bugtok/Moko, freckle, Panama, bract mosaic, abaca mosaic and/or bunchy top? If so, please provide details of BPI procedures to achieve and maintain area freedom from these pests. Could you also provide survey and monitoring data for each pest over a reasonable period, preferably 5 years, to demonstrate the efficacy of "area freedom" arrangements in eliminating the pest from a pest free area?

The RAP would like the Philippines to provide detailed operational work plans to explain/demonstrate the use of "area freedom" as a management measure for banana pests, diseases and weeds

Question 6

The response to question 6 is at variance with the response to question 62 and also discussions between Philippine experts and the TWG Chairs, according to which at least the following pests may occur on banana fruit: freckle, diamond spot, mealybugs, whiteflies and scale insects.

Hard scales (Diaspididae) have been intercepted on Philippine bananas by importing countries and *Aspidiotus destructor* has been identified as a pest in the Philippines. However, according to Sugimoto, S (1984) the scale insects (Coccoidea:Homoptera) were intercepted on banana fruits from Mindanao (Research Bulletin of the Plant Protection Service. Japan 30, 115-121 refers). The Philippines have not listed mites as pests of bananas in the Philippines although a number of spider mites known to be present in the Philippines and exotic to Australia (e.g., *Oligonychus orthius*, *O. velascoi* and *Caryota cumingii*) are reported to infest banana and a range of other crops. Could information on mite pests affecting bananas in the Philippines be provided?

Please provide a complete list of pests and "hitchhikers" (organisms that are normally not pests of banana fruit but may be associated with it) that have been detected on fresh banana fruit during pre-export inspections in the plantations and packhouses, and interceptions by importing countries in Philippine bananas?

Please provide all information regarding the interceptions of pests, diseases and hitchhikers on Philippine bananas from all export market sources, e.g., Japan, Taiwan, Middle East, New Zealand, China, Hong Kong, Russia, Singapore, Yugoslavia, Italy, Turkey, Iran and Egypt. Also, indicate if inspections are carried out in each export destination and what is the level of inspection and reporting?

Question 7

Please provide results of surveillance/monitoring and recording/reporting referred to in the BPI response. This information would be vital for developing precise and ultimately defensible estimates in the semi-quantitative/quantitative risk analysis models.

Question 8

Please provide a complete list of pesticides used in Philippine banana plantations (see response to questions 13 and expand; please also provide trade names of the pesticides). What is the rate and frequency of application of each pesticide?

Question 12

What concentrations of chlorine and alum are used and how are these concentrations monitored and maintained? How often is “topping up” or replenishment required with these chemicals under various fruit volume throughputs, climatic conditions, etc.?

Question 13

BPI has indicated that pesticide residues are of concern and require monitoring to meet maximum residue limit (MRL) standards. The reply indicates that pesticide residues are a concern, but does not nominate them. The final section then claims that there are no detectable residues basis [?] per pesticide and market tolerances. What pesticides have exceeded MRLs stipulated in CODEX ALIMENTARIUS in any export shipment and what levels of pesticide residues were detected?

Please provide results of pesticide residue monitoring by the Philippines and the importing countries, including a report from the USDA database if at all possible

Question 14

The reply states there is “adequate” biological pest information to support production of export quality bananas. Please specify the sources and detail of biological and pest management information for banana pests, diseases and weeds in the Philippines. Also, indicate how the term “adequate” was derived (given the heavy reliance on pesticides for the production of bananas in the Philippines.)

Please clarify if this information is included in the fact sheets provided by BPI to the RAP. Is there any additional information available and, if so, please provide such information?

Question 15

Do the data sheets include information from the Philippine private sector? The reply indicates there is unpublished data in the private sector. Do reputable researchers referee the scientific data? If this information is not in the public domain, what standards of efficacy and environmental impact are used and, does the FPA have access to the technical data from the private sector?

Question 17

The pathogens TWG understands that banana fruit can be infected with Banana bract mosaic virus. Has the Philippines recently conducted any work to demonstrate the presence of the virus in banana fruit and transmission of the virus by arthropod vectors from infected banana fruit to banana plants?

Question 18

The pathogens TWG has information from other sources that Moko infected plants can produce fruit bunches and the fruit may ripen prematurely following internal fruit infection. What is the frequency of premature ripe fruit caused by Moko in Philippine commercial Cavendish plantations?

Is there any information on the extent of rain splash dispersal of the bugtok/Moko bacterium? Can dried bacterial ooze be blown in from backyard banana plants to commercial Cavendish plantations? To what extent the bacterium can survive in or on fruit or in dried bacterial ooze?

Is it possible for the Moko bacterium to remain viable in the gum exudate when flowers are removed at bagging and remain viable but not infect the flower scar through the bunch filling and to ripening stage i.e. can the bacterium remain viable in the flower end scar tissue on banana fingers without actually invading the pulp of the fruit?

Questions 19

According to the investigations of the Pathogens TWG, there is now evidence available to the effect that bugtok and Moko isolates from the Philippines are genetically one and the same thing. Pathogenicity of bugtok isolates to Cavendish plants has also been demonstrated. From these studies, it can be extrapolated that strain B is present in the Philippines on both Cavendish and native cooking bananas, which carry the B genome (e.g. Lakatan and Saba). Work conducted in other countries has shown that B strain is highly insect-transmitted on bananas carrying the B genome and its transmission by insects to Cavendish inflorescence occurs at a relatively low rate. This situation appears to be similar to the observations in the Philippines.

In light of all the above information, it is reasonable to assume that native backyard bananas play a role in providing a source of inoculum for transmission of *Ralstonia solanacearum* Race 2 strain B to Cavendish plantations. This would also suggest that it would be extremely difficult to maintain Cavendish plantations free from this pathogen over a long period of time due to the likely ongoing influx of inoculum by contaminated insects from infected backyard bananas, which are widely distributed in Bukidnon, Cotabato and Davao.

Information is required to clarify how many strains of *Ralstonia solanacearum* Race 2 occur in the Philippines and at what level they are insect-transmitted to Cavendish inflorescences

Question 20

Information from other sources suggests that the Moko bacterium may survive in soil for more than two years. How long can the Moko bacterium survive in soil under favourable conditions? What data can be provided to support the claim of 6-12 months survival in soil?

Question 21

Numerous species of arthropods frequent banana inflorescences. What are the arthropod species known to occur on banana inflorescences in the Philippines and which of these are capable of transmitting Moko?

The reply states there are no observed insect vectors. It is stated in the reply to Question 14 that there is adequate pest management information available. If so, what research has been done to identify insect vectors of Moko? What are the results of any such research?

The RAP has found little information in the literature on studies associated with insect transmission of bugtok/Moko disease in the Philippines. The RAP would like information from any work done in the Philippines on insect transmission of bugtok/Moko including such things as: the insects involved in transmitting the bacteria; any studies on detection of the bacteria on insects; and the period the bacteria remains viable on insects.

Question 22

Please provide a list of plant species on which the Moko bacterium may occur in the Philippines taking into account the information on the host range of this pest in other countries and work conducted in the Philippines.

Question 23

What is the evidence that bugtok does not exist in commercial Cavendish plantations? Bugtok and Moko are caused by the same pathogen. It is highly possible that the disease occurs at very low levels in commercial Cavendish plantations as compared with its high incidence in native cooking bananas. Please clarify this issue

If bugtok can infect Cavendish, and bugtok is insect transmitted and the same causal organism as Moko, does this explain the random incidence of Moko infection in many plantations? Also, it is claimed Lorsban impregnated bags control bugtok. What data are available to support this claim, as the flower ends are attractive to insects well before the bags are applied? Also, Lorsban impregnated bags are not permitted for use in South Cotabato for environmental reasons. How is bugtok controlled there?

Question 24

Would Moko bacterium infect banana flowers if they were not removed? If the flowers were infected, how long could the bacteria survive in infected floral parts? Would viable bacteria be present in infected floral parts at the time of harvesting bananas?

Question 28

The reply does not indicate how effective the procedures are for ensuring freedom from leaf trash and contaminated soil. Is there any data to prove these measures are effective in ensuring freedom from contaminants? What measures are taken to eliminate dust contamination of cartons, pallets, etc., in packing areas and during transport to the wharf?

Question 29

Is there any evidence that the movement of contaminated farm machinery has resulted in spread of Moko disease in the Philippines?

Question 31

Are all Philippine banana growers/plantation managers required to keep records of pest and disease occurrences and pesticide applications? If so, does BPI have access to these records and could this information be made available to the RAP?

Question 32

The reply states there are environmental concerns in the Philippines associated with the production and consumption of bananas. What are these environmental concerns/problems, e.g., pesticide residues, contamination of waterways, soil, air, waste disposal, etc.? Provide details of testing results. What chemicals are of greatest concern for environmental problems?

Question 33

Regarding the Environmental Policy for addressing environmental concerns with banana production, the reply implies that the Environmental Compliance Certificate (ECC) of the DENR is the environmental policy. Apart from the ECC is there a set of environmental standards or a policy for addressing environmental concerns with banana production?

Question 34

The reply indicates that hitchhikers are present but there are no reported cases. Please explain the reply to this question regarding the occurrence of hitchhikers of bananas in the Philippines. Provide details of all interceptions of hitchhikers prior to shipping and at the destination port inspection.

Question 35

The RAP during their Philippines visit saw feral and native banana plants in close proximity to commercial plantations. The Philippines reply states these do not exist in the vicinity of commercial plantations. What is the regulatory policy regarding the distance of feral and native backyard bananas from commercial plantations and how is it policed?

Question 38

Provide details of all importing countries requirements/protocols/work plans for the importation of Philippine bananas to address their quarantine concerns?

Question 39

List all quarantine concerns from all importing countries of bananas from the Philippines. What measures do they require for fruit flies and other pests, diseases, weeds and hitchhikers?

Question 40

Please provide detailed information, e.g., work plans, procedural manuals and/or instructions that the BPI staff are required to follow to ensure that importing countries quarantine requirements are duly met.

Question 41

Records of interceptions and non-compliance are being kept by the Philippines. Provide a completion list of interceptions and non-compliances years reported by the importing countries.

Question 42

Provide details of inspection procedures prior to the issuance of the Phytosanitary Certificate.

Question 43

The reply states the methods of quality management rather than the QA system. Are all potential exporters operating under a certified and independently audited QA system, for example, ISO9002?

Question 44

Has the Philippines conducted any further trials to verify the efficacy of fruit surface disinfestation treatments in killing surface-borne inoculum of black Sigatoka fungus, freckle fungus and the Moko bacterium on fruit itself? Demonstration of efficacy of the surface disinfestation treatments in commercial scale operations is required. The work should be conducted following an acceptable experimental design(s) in a manner that the results would be accepted for publication in a refereed journal. The efficacy of the chlorine and alum treatment in killing the Moko bacterium in the form of dried ooze on the fruit surface is also required, particularly if viable bacteria are present in the dried ooze.

Some Australian stakeholders have raised the issue of recontamination of fruit with pathogens after the surface disinfestation treatment has been applied. Are any measures used by the Philippines to address such concerns?

Question 58

Regarding the latency of freckle disease in banana fruit, the meaning of latency in the context of the risk analysis is the period between infection and the appearance of symptoms. The latency period could vary depending on climatic conditions, for example, a prolonged latency period may be experienced under cooler conditions. What is the period of latency for freckle disease under different climatic conditions?

Question 60

It appears this question has been misunderstood. Our understanding of this 'issue' is that there may be a 'problem'. The Philippines reply appears to suggest there are no problems. Have any ill effects been recorded on humans and animals exposed to chemicals used in banana plantations and how are such health hazards managed?

Question 62

The reply has not nominated any hitchhiker or disease interceptions in Philippine bananas during pre-export inspection of bananas; please refer to text under question 6 above and provide a comprehensive response.

Question 67

The answer maybe interpreted as yes to the question of resistance by black Sigatoka to Calixin, though it is within acceptable levels. However, it is stated that no shift in population sensitivity has been detected. The Philippine experts advised the TWG Chairs that no resistance to Calixin has been detected. Please clarify this issue.

Question 72

According to the information from the Philippine literature, bugtok is endemic in backyard and feral banana plants surrounding the commercial Cavendish production areas. Please clarify this issue.

Question 73

Please refer to text under question 21 above and provide a response. Also, are any results available for the study mentioned in the BPI response?

Question 74

What evidence is there that the mode of transmission of the causal bacterium for Moko or bugtok in Cavendish banana is systemic infection and not insect transmission? The response is not consistent with the literature on the epidemiology of the B strain.

Question 75

Again, what evidence is there of exclusive systemic transmission of the causal bacterium producing Moko in Cavendish cultivars? The pattern of infection as seen from aerial inspection by the TWG Chairs would suggest a random pattern more indicative of insect transmission than a soil borne/or worker lapse in disinfestation of cutting tools.

Critical considerations requiring further investigations

The Risk Analysis Panel (RAP) has identified critical issues that require further investigation. The RAP would appreciate Philippines assistance with resolving as many of these issues as possible. Philippines has already indicated that fumigation with methyl bromide is detrimental to the quality of bananas. This fumigant may be acceptable for vacuum packed bananas, in polyethylene bags, to address certain quarantine concerns, for example, if contamination of packing materials soil is detected during quarantine inspections. It would be desirable to obtain information on methyl bromide and its efficacy against certain quarantine pathogens.

Moko/bugtok

1. Incidence of symptomatic and asymptomatic fruit infection in banana plantations, including information on how this can be measured.
2. Viability of the Moko/bugtok bacterium within the fruit tissue following storage and transport.
3. Presence and viability of Moko/bugtok bacteria on the fruit surface.
4. Efficacy of chlorine and alum dip in killing Moko/bugtok bacteria contaminating the fruit surface.
5. Presence of bacterial ooze on fruit surface and viability of the Moko/bugtok bacteria in the ooze.
6. Efficacy of chlorine and alum dip in killing Moko/bugtok bacteria contaminating the fruit surface.
7. Presence and viability of Moko/bugtok bacteria in and on floral remnants.
8. Efficacy of chlorine and alum dip in killing Moko/bugtok bacteria in or on floral remnants.
9. Presence and viability of Moko/bugtok bacteria in and on leaf trash.
10. Efficacy of chlorine and alum dip in killing Moko/bugtok bacteria in or on leaf trash.
11. Presence and viability of Moko/bugtok bacteria in soil adhering pallets, cartons and banana fruit.
12. Efficacy if treatments (if available, e.g. methyl bromide fumigation) in killing Moko/bugtok bacteria contaminating the soil adhering pallets, cartons and banana fruit.
13. Presence and viability of Moko/bugtok bacteria occurring on arthropod and other hitchhikers.
14. Efficacy of chlorine and alum dip in killing Moko/bugtok bacteria occurring on arthropod and other hitchhikers.
15. Presence and viability of Moko/bugtok bacteria on seeds of alternative hosts.
16. Efficacy of chlorine and alum dip in killing Moko/bugtok bacteria occurring on seeds of alternative hosts.
17. Penetration of chlorine and alum dip into the floral end of the fruit and between fruit stalks at around the junction with the cushions? Depth of penetration of the dip into trash and cushion tissue, and effect on bacteria within the tissue so penetrated.
18. Arthropod and other vectors of Moko/bugtok.
19. Alternative hosts of Moko/bugtok, including those in which the bacteria multiply within the tissues and those on which the bacteria multiply and/or survive on the root and plant surfaces.
20. Efficacy of methyl bromide treatment in killing Moko/bugtok bacteria contaminating fruit, packaging material (cartons, polyethylene bags, plastic sheets, polystyrene pads, pallets etc), soil, trash (floral remnants, leaf material, etc.), arthropods and other vectors.

Black Sigatoka

1. Viability of spores of the black Sigatoka fungus occurring as contaminants of banana fruit, floral remnants and packaging material.
2. Effect of storage and transport conditions on the viability of spores of the black Sigatoka fungus occurring as contaminants of banana fruit, floral remnants and packaging material.
3. Efficacy of chlorine and alum dip in killing spores of the black Sigatoka fungus occurring as contaminants of banana fruit, floral remnants and packaging material.
4. Efficacy of methyl bromide treatment in killing spores of the black Sigatoka fungus.
5. Incidence of perithecia in leaf tissue remnants caught between the fingers of fruit clusters.
6. Efficacy of methyl bromide in killing perithecia in infested leaf tissue remnants.

Freckle

1. Incidence of symptomatic and asymptomatic fruit infection in banana plantations, including information on how this can be measured.
2. Sporulation of the freckle fungus on infected banana fruit.
3. Viability of pycnidia, conidia, perithecia and ascospores of the freckle fungus occurring as contaminants of banana fruit, leaf remnants, floral remnants and packaging material.
4. Effect of storage and transport conditions on the viability of spores and spore bodies of the freckle fungus occurring as contaminants of banana fruit, leaf remnants, floral remnants and packaging material.
5. Efficacy of chlorine and alum dip in killing spores and spore bodies of the freckle fungus occurring as contaminants of banana fruit, leaf remnants, floral remnants and packaging material.
6. Efficacy of methyl bromide treatment in killing spores and spore bodies of the freckle fungus contaminating banana fruit, leaf remnants, floral remnants and packaging material.

Panama

1. Efficacy of methyl bromide treatment in killing spores of the Panama disease in soil adhering to banana fruit, soil, trash and packaging material.

Banana bract mosaic

1. Incidence of symptomatic and asymptomatic fruit infection in banana plantations, including information on how this can be measured.
2. Presence and concentration of the virus in the peel of the banana fruit.
3. Ability of the insect vectors to acquire the virus from infected fruit and transmit to banana or other susceptible host plants.
4. Effect of storage and transport conditions on the concentration and infectivity of the virus.
5. Presence of the vectors of the virus in export bananas and their ability to transmit disease following storage and transport.

Abaca mosaic virus

1. Incidence of symptomatic and asymptomatic fruit infection in banana plantations, including information on how this can be measured.
2. Presence and concentration of the virus in the peel of the banana fruit.
3. Ability of the insect vectors to acquire the virus from infected fruit and transmit to banana or other susceptible host plants.
4. Effect of storage and transport conditions on the concentration and infectivity of the virus.
5. Presence of the vectors of the virus in export bananas and their ability to transmit disease following storage and transport.

Fruit flies

1. Verification of non-host status of hard green bananas.