FINAL IMPORT RISK ANALYSIS ON THE PROPOSAL TO CHANGE THE TREATMENT FOR MANGO (*Mangifera indica* L.) FRUIT FROM THE REPUBLIC OF THE PHILIPPINES

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It is my determination that the importation of fruit of mango (*Mangifera indica* L.) from the Republic of the Philippines will be permitted subject to the application of phytosanitary requirements as specified in Section 6 of this final import risk analysis paper. These requirements maintain Australia's appropriate level of protection and accord with Australia's international rights and obligations under the Agreement on Application of Sanitary and Phytosanitary Measures. Furthermore, the import risk analysis has been conducted in accordance with the agreed process.

Paul Hickey
Executive Director

February 1999

Acknowledgments:
Principal contributors to this IRA were Louise van Meurs, Neil Ellis and Mike Jefferies. Major technical and editorial import was provided by Marion Healy, Bob Ikin, Lyn Liyanage, Kay Lindsay, Tom Parnell, Brian Tucker and Rob McGahy.

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1. AUSTRALIAN QUARANTINE AND INSPECTION SERVICE'S POSITION

Subject to the application of the appropriate phytosanitary requirements (given in full in Section 6 of this document) the Australian Quarantine and Inspection Service (AQIS) approves the continued importation of mango fruit from Guimaras Island, the Republic of the Philippines under changed conditions.

2. EXECUTIVE SUMMARY

Mango fruit from the Philippines currently has access to Australia using fumigation with ethylene dibromide (EDB). As a consequence of the concerns over the use and limited supplies of this chemical, the Philippine authorities have sought an alternative treatment to address the risk posed by some pests and have proposed the vapour heat treatment (VHT). The application was subjected to an import risk analysis (IRA), based on the relevant International Standards for Phytosanitary Measures (ISPM) and other standards being developed by the Secretariat of the International Plant Protection Convention (IPPC) of the Food and Agriculture Organization (FAO) of the United Nations.

Risk Identification

The import risk analysis process took into account factors such as the biology, host range, distribution, entry potential, establishment potential, spread potential and economic damage potential of the pests and diseases that may be associated with mango fruit. The risk analysis (AQIS, 1998a) identified 7 quarantine pests and diseases of concern to Australia that have a significant risk of being associated with mango fruit. The 7 quarantine pests and diseases are identified as either not present in Australia or present but under official control. The risk analysis identified management procedures which could reliably reduce the risk of these pests and diseases being associated with mango fruit imported into Australia to an acceptably low level.

The mango seed weevil, (MSW), *Sternochetes mangiferae* Fabricius, was identified as being of concern if present in the Philippines as it is not present in Western Australia, where mangoes from MSW areas are prohibited, and surveys for it in the Philippines have not covered all areas. This brought the pests of concern to 8.

After consideration of these 8 pests and diseases, and stakeholder consultation, AQIS has concluded that the risk posed by the pests and diseases could be managed with appropriate phytosanitary requirements. The measures proposed to address the risk posed by these pests and diseases are set out below.

Risk Management

The following risk management procedures are determined to be appropriate to reduce the likelihood of the quarantine pests and diseases being associated with fruit to negligible levels.

For the three fruit flies, *Bactrocera cucurbitae, B. occipitalis* and *B. philippinensis*, vapour heat treatment (VHT) of the fruit such that the pulp of the fruit is held at a temperature of 46^0C for 10 minutes which is demonstrated to kill all stages of these flies.

Three of the identified quarantinable pests can be managed through routine phytosanitary procedures and inspection methods. These are: *Nephopterix* sp., black borer; *Noorda albizonalis*, red-banded borer and *Planococcus lilacinus*, coffee mealybug.

Requirements for the remaining quarantine pests are as follows: *Sternochetus frigidus*, mango pulp weevil (MPW) and *Sternochetus mangiferae*, mango seed weevil (MSW); detection/monitoring surveys to establish area/country freedom, or equivalent measures.

An Australian entomologist with extensive experience in planning and implementation of surveys and mango pests, will oversee the survey of Guimaras Island, proposed by the Philippines Bureau of Plant Industry (BPI) for 1999. This survey will be implemented by BPI with funding from AusAID through the Bureau of Resource Sciences, Department of Agriculture, Fisheries and Forestry, for quarantine pests, in particular to ensure that it meets AQIS' criteria for accepting the island as free of mango pulp weevil.

If any pests or diseases requiring area freedom or live specimens of pests required to be controlled by vapour heat treatment are detected, imports must cease immediately pending the outcome of an investigation. In the event of quarantine pests or diseases, other than those requiring area freedom or vapour heat treatment, being detected in any export 'lots' all fruit comprising that 'lot' must be rejected.

AQIS is satisfied that importation of mango fruit under the specified conditions will present negligible risk to the environment and accordingly that the obligations arising from the Administrative Procedures made under the Environment Protection (Impact of Proposals) Act 1974 have been met.

Implementation

Implementation will be subject to Guimaras Island being free of MPW based on the survey to be carried out by BPI in 1999 and after evaluation and acceptance of the results of the survey by AQIS.
AQIS will develop an arrangement with BPI based on these requirements for the importation of mango fruit. The requirements and the arrangement must be reviewed at the end of the first year of trade and may be reviewed after each subsequent season.

3. BACKGROUND

Mango fruit from the Philippines currently has access to Australia using fumigation with EDB. As a consequence of the concerns over the use and limited supplies of this chemical, the Philippine authorities have sought an alternative treatment to address the risk posed by some pests and have proposed the VHT process.

AQIS held bilateral technical discussions with the Philippine authorities in June 1996. Following this meeting three options were agreed with BPI to advance AQIS's consideration of entry of mango fruit from the Philippines under the alternative arrangements. These options were to source fruit from:

Option 1. Guimaras Island only, under area freedom for MPW and/or

Option 2. a number of areas of the Philippines, excluding the Palawan Island group, based on the systems approach to address the quarantine concerns or

Option 3. a number of areas of the Philippines, excluding the Palawan Island group, based on surveys which demonstrate area freedom for MPW.

Subsequent to the technical discussions in June 1996, AQIS arranged for a technical specialist to visit the Philippines in April 1997 to investigate aspects of MPW biology and the quarantine conditions in the Philippines that address the risk of this pest being present in export fruit including:

. study of the MPW biology
. evaluation of the internal quarantine controls on Palawan Island and
. inspection and fruit cutting of culled fruit in the packing shed

AQIS commenced an Import Risk Analysis (IRA) in 1997 in accordance with the relevant International Standards for Phytosanitary Measures (ISPM) (ie. *Reference Standard, Principles of Plant Quarantine as Related to International Trade, ISPM No. 1, FAO* 1995; *Part 1-Import Regulations, Guidelines for Pest Risk Analysis, ISPM No. 2, FAO* 1996; and other standards being developed by the Secretariat of the International Plant Protection Convention (IPPC) of the Food and Agriculture Organization (FAO) of the United Nations). Pests and diseases of quarantine concern and proposed management options were identified in the document, *Technical Paper on the proposal to change the treatment for mango (Mangifera indica L.) fruit from the Republic of the Philippines* (1998a).

AQIS developed a draft IRA entitled *Draft Import Risk Analysis paper on the proposal to change the treatment for mango (Mangifera indica L.) fruit from the Republic of the Philippines* (1998b), summarising the pests identified in the IRA requiring specific management and inspection procedures. This document was circulated for stakeholder consultation on 30 April 1998. Comments were requested by 30 June 1998. Notification of the proposed importation was provided to the World Trade Organization (WTO) as required under the provisions of the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement).

In this document the term Import Risk Analysis is synonymous with the term Pest Risk Analysis defined in the *Glossary of Phytosanitary Terms* (1997).

4. STAKEHOLDER CONSULTATION

AQIS sent the draft IRA to 55 stakeholders and received 13 written replies (Section 10-List of Respondents). These comprised 3 from industry groups representing growers, 6 from Australian State Departments of Agriculture, 2 from Commonwealth Departments, 1 from research organisations and 1 from BPI.

In summary:

- of the 13 replies all but one respondent either supported (5), or did not oppose (7), the importation; however several respondents were concerned over the sample rates and risk levels proposed in the draft

IRA and one preferred option 1. The matters raised by respondents are discussed in Section 9 - Issues Raised by Stakeholders in Response to AQIS's Draft IRA.
- the one respondent that opposed to the proposed changes did so on the basis that there was not 100% protection for the industry from pests.

- No pests additional to those listed in the draft IRA were identified by the respondents. On the basis of information provided by several respondents the status of two pests and one disease was amended from non-quarantine to quarantine (Section 9-Issues Raised by Stakeholders in Response to AQIS's Draft IRA, Issue 5).

BPI informed AQIS that it would proceed with Option 1 in the draft IRA (1998a) and so this paper only addresses those issues pertaining to the implementation of this Option in Section 6: Phytosanitary Requirements

5. SUMMARY OF IMPORT CONDITIONS

The following conditions, or equivalent measures, are required for importation of fruit of mango from the Philippines.

- pest surveillance and management programs in the production areas
- area freedom for MPW
- postharvest treatment for fruit flies (VHT)
- phytosanitary certification
- verification of consignment in Australia

Fruit must not be permitted into Western Australia as mango fruit from any source is currently prohibited entry under WA State legislation. However, there will be no restrictions imposed by AQIS on other ports of entry.

To address the issues raised by the lack of up-to-date survey data for fruit from Guimaras Island, nominated by BPI under Option 1 of the draft IRA (1998a), the following procedures will be instigated before exports are permitted.

- pre-harvest visit by an Australian entomologist to supervise the survey of Guimaras Island for mango pulp weevil and other pests of concern.
- analysis of survey findings by AQIS. The detection of MPW on Guimaras Island will result in prohibition of mango fruit from the Philippines until alternative effective procedures are agreed.

The revised phytosanitary requirements for the importation of mango fruit are given in Section 6-Phytosanitary Requirements.

6. PHYTOSANITARY REQUIREMENTS

Item 1 Area freedom certification for MPW

Guimaras Island is considered by the Philippines to be an area free of MPW because an extensive detection survey of mango plantings in 1993 failed to find either MPW or MSW infestation on the island. As the island has not been surveyed since 1993, AQIS requires a monitoring survey be undertaken in the peak mango season (February to April) for Guimaras Island. The results must be submitted to AQIS before access can be considered.

BPI must provide AQIS with the overall methodology to be used for the monitoring surveys for consideration before commencement of the survey. AQIS will accept the fruit cutting methodology outlined in the Guimaras Island detection survey but will require a sample size that ensures that, if MPW was present on Guimaras Island with 1% or greater number of trees infested and 15% of fruit infested per tree, the survey will detect the pest 95% of the time. The methodology and the timing of the survey will be agreed between BPI and AQIS based on the biology of MPW and practical conditions in the areas to be surveyed including the number of trees and the varieties of mango in each area.

Item 2 Implementation of quarantine on Guimaras Island

AQIS requires that the internal legislation, currently in place, continue to be enforced to ensure that there is no movement of mango fruits and seeds from other areas of the Philippines into Guimaras Island.

The Special Quarantine Administrative Order No. 20, series of 1987, BPI, declares *Sternochetus frigidus*, MPW an injurious and dangerous pest of mangoes and places the Palawan Island group under quarantine. The movement, transfer or carrying of mango trees, fruits or parts thereof capable of harbouring MPW is prohibited and companies engaged in transportation are specifically prohibited from conveying these materials from the Palawan Island group to any other part of the country.

Proclamation No. 314 on 23 December 1993 declares the island of Guimaras as a Special Quarantine Zone, an area free of MPW and MSW and provides mechanisms to maintain the area freedom status. BPI Special Quarantine Order No.1, sets out the operational detail for the enforcement of Proclamation No. 314.

Item 3 Security of fruit from Guimaras Island to treatment plants in Manila

BPI will have in place procedures to ensure that fruit for export to Australia is only sourced from Guimaras Island. The fruit must be packed securely and identified as Guimaras Island fruit before being transported to the registered treatment plants in Manila. The procedures to ensure that security of fruit is achieved will be detailed in a specific commodity understanding (SCU) and will be audited and found satisfactory by AQIS, before exports will be permitted.

Item 4 Security on arrival at treatment centres

On arrival at the registered treatment centre the packages will be checked by a BPI officer to ensure that integrity of the packages has not been compromised. If the packages are accepted they will be stored in a designated area away from other fruit to ensure that only Guimaras Island fruit is sent for treatment for export to Australia. Transfer of fruit into treatment trays will be done under the supervision of BPI. The treatment trays will be marked indicating that the fruit is sourced from Guimaras Island for export to Australia only. Fruit for other destinations will not be treated in the chamber at the same time as Guimaras Island fruit for Australia.

Item 5 Treatment facilities

AQIS will only approve designated and identified VHT facilities that are registered by BPI. These facilities must be designed to prevent the entry of fruit flies into areas where unpacked treated fruit is held. This will include a provision for treated fruit to be discharged directly into insect proof and secure packing rooms.

The management of the treatment facility will be required to provide details of systems that are in place to ensure isolation and segregation from other fruit throughout the treatment, packing, storage and transport stages before exports commence. This will be audited for compliance with AQIS requirements in the initial export season by AQIS before exports will be permitted.

After the initial season approval of the registered treatment centres, AQIS will require BPI to audit the facilities at the beginning of each season to ensure that they comply with AQIS requirements before registration is renewed. BPI would then monitor the treatment centres on an ongoing basis during their operational season to ensure continued compliance with AQIS requirements. Reports of audits noting any non-conformities together with appropriate corrective action will be submitted to AQIS.

BPI officers will ensure the following:

- registered treatment facilities are maintained in a condition that will provide efficacy in treatment programs
- all areas are hygienically maintained (cleaned daily of damaged, blemished, infested fruit) the premises are maintained to exclude the entry of pests from outside and between treated and untreated fruit
- all measurement instruments are regularly calibrated and records retained for verification
- the movement of fruit from the time of arrival at the registered treatment centre through to the time of export are recorded and
- the security of fruit is maintained at all times that fruit is on the premises.

Should BPI officers find that any one of the above requirements are not being undertaken the registered facility will be suspended until corrective action has been completed and AQIS agreement to the reinstatement obtained.

Item 6 Vapour heat treatment requirements

The VHT treatment specified in the SCU has been assessed as effective against all quarantine fruit flies.

VHT sensors will be calibrated by an appropriate BPI Plant Quarantine Officer using a certified thermometer. All certified thermometers will be checked annually against a reference thermometer calibrated by the appropriate national standards authority.

The number and location of fruit sensors in each chamber will depend on the make and model of the treatment unit which will be specified in the SCU.

Sensors will be placed in fruit chosen from amongst the largest size fruit in each chamber load. Placement of probes within the chamber and the method to insert probes will be specified within the SCU.

Treatment time will commence when the pulp core temperature of all probe monitored fruit reaches 46°C, and this temperature will be maintained for 10 minutes.

BPI will ensure that copies of the data logger records of each treatment, supplied to BPI by the respective registered facility operators after each treatment, are forwarded to AQIS. This documentation will include the Phytosanitary Certificate (PC) numbers and import permit number that are applicable to that treatment. Information regarding the mode of conveyance and port of entry will be included in the relevant sections on the PC. This requirement may be reviewed after one season of operation to determine whether this provides adequate control.

Item 7 Packing, storage and loading of treated fruit

The fruit is to be packed in new cartons sealed with a BPI sticker or seal securely placed across the carton opening. No unprocessed packing material of plant origin is to be used.

Any openings in cartons are to be either screened with mesh no greater than 1.6mm diameter or covered with tape to ensure any opening greater than 1.6mm diameter is closed.

All cartons will be marked "For Australia", labelled with packing date, registered packing house name or number and registered treatment centre establishment name or number.

Fruit inspected and cleared by BPI for export to Australia will be packed, sealed and stored under security, segregated from all other fruit in storage until loading.

Item 8 Inspection and Phytosanitary Certification

An inspection 'lot' is no greater than all mango fruit treated for export to Australia on one day from one registered treatment centre.

The fruit will be sampled by BPI in accordance with the sampling plan which will be detailed in the SCU document, at 600 fruit per lot. Up to 500 fruit to make up the sample may come from treated fruit culled during packing. 100 fruit, or enough fruit to make up 600 fruit if not enough fruit is available from the cull, will be taken from treated fruit selected for packing. The sample fruit will be examined externally first and then cut to check for internal feeding insects.

Internal feeding insects found in the sampled fruit must be identified by a designated technical expert and the resulting determinations together with the source and date of harvest submitted to AQIS. No fruits are permitted to be exported to Australia while identification is pending.

If MPW or any previously unrecorded fruit or seed feeding species are identified all mango exports from the Philippines will be suspended and AQIS informed immediately. Fruit in transit will be refused entry.

If live fruit flies are found in exports from a registered treatment plant it will be suspended and any previously treated fruit in store rejected for export. BPI will isolate the cartons and label the cartons "not for export to Australia" or deface the "For Australia" marks. AQIS will be informed immediately.

If other quarantine pests, including *Noorda albizonalis* and/or *Nephopterix* sp. are identified the lot will be rejected for export to Australia. BPI will isolate the cartons and label the cartons "not for export to Australia" or deface the "For Australia" marks.

If fruit sampling and inspection is carried out with no quarantine pests detected, a PC is to be issued by BPI for each 'lot'. The PC will bear the number of cartons per lot and the treatment centre name and details of the treatment undertaken, container seal number if applied, and the additional declarations required under the SCU.

Item 9 On arrival inspection

A consignment is the fruit covered by one PC that arrives at one port in one shipment.

On-arrival inspection for quarantine pests will be carried out by AQIS on each consignment in accordance with the sampling plan outlined in the SCU which will be at the rate of 600 fruit per consignment. AQIS will take the following action if quarantine pests including exotic fruit flies are found or the certification does not conform to specifications or the seals on the shipping containers are damaged. Fruit showing damage or punctures may be cut for internal examination.

Fruit flies

Any consignment found to be infested will be refused entry with the options of re-export or destruction. AQIS will inform BPI that the export program is suspended immediately and fruit from the Philippines would be refused entry until the source of the infested fruit is identified, the reasons for failure established and appropriate corrective action is agreed between the BPI and AQIS.

Mango pulp weevil

Any consignment found to be infested or containing dead MPW will be refused entry with the options of re-export or destruction. AQIS will inform BPI that the export program is suspended immediately and fruit from the Philippines would be refused entry until the source of the infested fruit is identified, the reasons for failure established and appropriate corrective action is agreed between the BPI and AQIS.

Mango caterpillars

Any consignment found to be infested will be refused entry with the options of re-export or destruction. AQIS will inform BPI immediately.

Other quarantine pests

Any consignment found to be infested with other quarantine pests will be given the options of re-export, destruction or treatment. AQIS will inform BPI of the details of such findings including documentation, and request corrective action.

Documentation errors

Any consignment found to be with defective or incomplete documentation may be refused entry with the options of re-export or destruction. AQIS will hold consignments and inform BPI immediately so that they can attempt to address the problem.

7. PESTS ASSOCIATED WITH MANGO IN THE PHILIPPINES

Table 1. Risk Potential from Pests Associated with mango fruit in the Philippines

The species listed in the following table were identified during the risk analysis (AQIS, 1998a) as pests and diseases associated with mango in the Philippines. The distribution, quarantine status, assessment of risk potential and management options is shown.

Species	Common Name	Present in Philippines	Present in Australia	Australian quarantine status	Present in pathway	Quarantine managment required[1]
Arthropods						
Aleurocanthus woglumi	citrus blackfly	yes	no	Quarantine	no	
Bactrocera cucurbitae	melon fly	yes	no	Quarantine	yes	yes
Bactrocera occipitalis	fruit fly	yes	no	Quarantine	yes	yes
Bactrocera philippinensis	Philippine fruit fly	yes	no	Quarantine	yes	yes
Chlumetia brevisigna	twig borer	yes	no	Quarantine	no	
Chlumetia transversa	twig borer	yes	no	Quarantine	no	
Eudocima fullonia	fruit piercing moth	yes	yes	Non Quarantine	no	
Helopeltis sp.	mosquito bug	yes	no	Quarantine	no	
Icerya seychellarum	Seychelles fluted scale	yes	yes	Non Quarantine	yes	
Idioscopus clypealis	mango leafhopper	yes	no	Quarantine	no	
Idioscopus nitidulus	leafhopper	yes	yes - part	Quarantine	no	
Mictis longicornis	twig wilter	yes	no	Quarantine	no	
Nephopterix sp.	black borer	yes	no	Quarantine	yes	yes

[1] - Quarantine status. Defined according to the 1997 IPPC.
"Pest" - any species, strain or biotype of plant, animal or pathological agent injurious to plants or plant products.
"Regulated pest" - a quarantine pest or a regulated non-quarantine pest.
"Quarantine pest" - a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled. [abbreviation QP]
"Regulated non-quarantine pest" - a non-quarantine pest whose presence **in plants for planting** affects the intended use of those plants with an economically unacceptable impact and which is therefor regulated within the territory of the importing contracting party. [abbreviation RNQP]
By implication all other pests are non-regulated pests (formerly non-quarantine pests) that should not require phytosanitary action. [abbreviation NQ]

Species	Common Name	Present in Philippines	Present in Australia	Australian quarantine status	Present in pathway	Quarantine managment required[1]
Niphonoclea albata	twig borer	yes	no	Quarantine	no	
Niphonoclea capito	twig borer	yes	no	Quarantine	no	
Noorda albizonalis	red-banded caterpillar	yes	no	Quarantine	yes	yes
Orgyia postica	Oriental tussock moth	yes	no	Quarantine	no	
Parasa lepida	blue-striped nettle grub	yes	no	Quarantine	no	
Planococcus lilacinus	coffee mealybug	yes	no	Quarantine	yes	yes
Saissetia coffeae	helmet scale	yes	no	Quarantine	no	
Sternochetus frigidus	mango pulp weevil	yes	no	Quarantine	yes	yes
Sternochetus mangiferae	mango seed weevil	uncertain	yes - part	Quarantine	yes	yes
Thosea sp.	slug caterpillar	yes	no	Quarantine	no	
Thosea sinensis	slug caterpillar	yes	no	Quarantine	no	
Typhlocyba nigrobilineata	mango hopper	yes	no	Quarantine	no	
Algae						
Cephaleuros virescens	algal leaf spot	yes	yes	Non Quarantine	no	
Bacteria						
Xanthomonas campestris pv. *mangiferaeindicae*	bacterial black spot	yes	yes	Non Quarantine	yes	
Fungi						
Alternaria alternata	alternaria rot	yes	yes	Non Quarantine	yes	
Aspergillus niger	black mould	yes	yes	Non Quarantine	yes	
Botrytis cinerea	blossom blight	yes	yes	Non Quarantine	yes	
Colletotrichum gloeosporioides	anthracnose	yes	yes	Non Quarantine	yes	
Cytosphaera mangiferae	stem end rot	yes	yes	Non Quarantine	yes	
Dothiorella dominicana	stem end rot	yes	yes	Non Quarantine	yes	
Dothiorella mangiferae	stem end rot	yes	yes	Non Quarantine	yes	

Species	Common Name	Present in Philippines	Present in Australia	Australian quarantine status	Present in pathway	Quarantine managment required[1]
Elsinoe mangiferae	mango scab	yes	yes - part	Quarantine	yes (low)	yes
Erythricium salmonicolor	pink disease	yes	yes	Non Quarantine	no	
Geotrichum candidum	sour rot	yes	yes	Non Quarantine	yes	
Guignardia mangiferae	phyllosticta rot	yes	yes	Non Quarantine	yes	
Lasiodiplodia theobromae	stem end rot	yes	yes	Non Quarantine	yes	
Macrophoma luzonensis	grey leaf spot	yes	no	Quarantine	no	
Macrophomina phaseolina	charcoal rot	yes	yes	Non Quarantine	no	
Mucor circinelloides	mucor rot	yes	yes	Non Quarantine	yes	
Nattrassia mangiferae	stem end rot	yes	yes	Non Quarantine	yes	
Oidium mangiferae	powdery mildew	yes	yes	Non Quarantine	no	
Penicillium spp.	blue mould	yes	yes	Non Quarantine	yes	
Pestalotiopsis mangiferae	grey leaf spot	yes	yes	Non Quarantine	yes	
Phoma glomerata	phoma rot	yes	yes	Non Quarantine	no	
Phoma sorghina	phoma rot	yes	yes	Non Quarantine	no	
Phomopsis mangiferae	stem end rot	yes	yes	Non Quarantine	yes	
Phytophthora nicotianae var. *parasitica*	phytophthora rot	yes	yes	Non Quarantine	yes	
Phytophthora palmivora	phytophthora rot	yes	yes	Non Quarantine	no	
Rhizopus arrhizus	rhizopus rot	yes	yes	Non Quarantine	yes	
Rhizopus oryzae	rhizopus rot	yes	yes	Non Quarantine	yes	
Rhizopus stolonifer	transit rot	yes	yes	Non Quarantine	yes	
Stemphylium vesicarium	stemphylum rot	yes	yes	Non Quarantine	yes	
Stigmina mangiferae	stigmina rot	yes	yes	Non Quarantine	no	

Nematoda						
Hemicriconemoides mangiferae		yes	yes	Non Quarantine	no	

8. QUARANTINE PESTS WITH HIGH RISK POTENTIAL FOR AUSTRALIA

The following list contains species of concern to Australia with a high entry potential and high potential impact rating. The list has been revised on the basis of information provided by respondents.

LIST 1. REVISED SUMMARY OF QUARANTINE PESTS WITH HIGH RISK POTENTIAL FOR AUSTRALIA

1. *Bactrocera cucurbitae* (Colquillett), melon fly
2. *Bactrocera occipitalis* (Bezzi), fruit fly
3. *Bactrocera philippinensis* Drew & Hancock, Philippine fruit fly
4. *Nephopterix* sp. Hubner, black borer
5. *Noorda albizonalis* Hampson, red-banded borer
6. *Planococcus lilacinus* (Cockerell), coffee mealybug
7. *Sternochetus frigidus* Fabricius, mango pulp weevil
8. *Sternochetus mangiferae* Fabricius, mango seed weevil; Western Australia only
9. *Elsinoe mangiferae*, mango scab; Western Australia only

9. ISSUES RAISED BY STAKEHOLDERS IN RESPONSE TO AQIS' DRAFT IRA

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9.1 General Issues

9.1.1 Equivalence between Philippine and Australian requirements

Issue: 1
Queensland producers are inspected on an annual basis to be accredited as mango seed weevil (MSW) free whereas the Philippines had their area surveyed only once in 1993. No consistent crop monitoring program has been in place for the last five years. February-March is the harvesting season, why is the monitoring program being implemented then and not earlier. Also the monitoring will detect the possibility of the MPW 95% of the time; what about the undetected 5% of fruit.

AQIS' position:
It is never possible to be 100% sure that a pest is absent; for example samples from both orchards and fruit are used to certify mango exports from Australia to be free from mango seed weevil in the same way as will be done for MPW from the Philippines. The 1993 survey of Guimaras Island, under USDA supervision, showed no infestations of MSW or MPW. No mangos will be allowed from the designated area until a comprehensive and statistically appropriate survey of the area continues to show no infestation of MPW. This survey is planned for 1999 at the time when the pest is easiest to find just before the fruit is mature and the larvae are at their largest. Ongoing surveys will be required, if the area is shown to be free, to ensure any subsequent infestation of the area is detected. In addition internal examination of fruit will be required on samples from every shipment for this and other internal feeders thus providing an added level of assurance.

9.1.2 Proposed options

Issue: 2
Given the decentralised nature of the country, Option 2, which would allow export of mangoes from all parts of the Philippines, would require a very high level of monitoring and security.

AQIS' position:
AQIS will require effective management systems and audits for this Option to be acceptable. This option is not being pursued by the Philippines at this time.

Issue: 3
Change Section 6.2 from fruit 'could' be sourced to fruit 'will' be sourced.

AQIS' position:
This refers to the three options originally proposed and is not relevant the option covered by this paper.

9.1.3 Confidence in survey for mango pulp weevil

Issue: 4
For Mango Pulp Weevil *(Sternochetes frigidus)* MPW a range of concerns were expressed about the timing, scope, degree of reliability and confidence level of the survey, the cost to industry if MPW became established in Australia and the fact that it cannot be detected by external examination nor controlled by the VHT.

AQIS' position:
Because it is not possible to rely on visual inspection to ensure that MPW is not present in fruit to be exported from the Philippines , nor is the effect of the VHT determined, the primary requirement is for the Philippines to show that MPW is not present in the area from which the fruit is to be sourced. The required survey is designed to do that to a high degree of confidence at the time and on fruit when the pest is most easy to find. The detection of one fruit infested with MPW in the 46,000 to be internally examined during the survey will show the area is not free of this pest and so will remove the possibility of export of fruit from Guimaras Island using this option. In addition sampling the fruit from each shipment will provide a further check on the presence of this and other internal feeders, the presence of which will require a reassessment of the import conditions and a suspension of the trade during this process.

9.2 Pest Risk Assessment

9.2.1 Quarantine pest list

Issue: 5
Mango Seed Weevil *(Sternochetes mangiferae)* and Mango Leafhopper *(Ideoscopus nitidulus)* are not present in WA and are quarantinable pests with legislative controls governing entry.

AQIS' position:
This status is recognised by AQIS and the altering of status from non-quarantinable to quarantinable is therefore justified.

9.2.2 Arthropod pest issues

Issue: 6
The presence of *Chlumetia transversa* in Australia is doubtful, as it is based on one specimen from the Atherton Tableland whose identity is uncertain. This should remain as a quarantine pest although it is probably low risk with respect to fruit imports.

AQIS' position:
Agreed; status changed to quarantine pest. However not likely on imports, no stages associated with fruit.

Issue: 7
No mite pests are listed. The tetranychid *Oligonychus mangiferus* is a pest of mangoes and grapevines in India and other SE Asian locales. There are recent descriptions of eriophyid mites on mangoes in Guam and Taiwan. It is possible these could be pests of mangoes in the Philippines. Literature indicates that a treatment of 46^0C for 10 minutes may only kill 80-85% of mites present. Inspection would need to be adequate to address this.

AQIS' position:
No records of mites on mango fruit from the Philippines were found. Given that the temperature at fruit surface is 46^0C for much longer than 10 minutes, more likely an hour, this may not indicate an ineffective regime. Inspection of fruit samples at packing will be a source of further information as will the survey for MPW and other pests on Guimaras Island at which time the issue of mite pests found can be addressed.

9.2.3 Disease issues

Issue: 8
Guignardia mangiferae is not recorded from Queensland. *Macrophoma luzonensis* may be associated with fruit as is a similar sp. from India. *M. mangiferae* affects fruit as well as stems and leaves but is not serious.

AQIS' position:
Guignardia mangiferae can cause leaf spot on fruit but rarely causes extensive losses. If fruits are affected they would be rejected at inspection. *M. luzonensis* mainly causes leaf spots and generally is not associated with fruit infections.

Issue: 9
Elsinoe mangiferae, Mango Scab is not recorded from Western Australia and is subject to legislative controls but it is accepted that it is only of concern on planting material.

AQIS' position:
Scab is usually a problem on young mango seedlings. Young fruit is affected causing greyish brown lesions which expand as the fruit matures imparting a cracked and corky appearance. Mature fruit with this appearance would be rejected at packing as unmarketable.

9.2.4 General pest issues

Issue: 10
The Australian environment is ideal for mango pests to establish therefore the risk/economic importance levels are significantly higher than for Japan.

AQIS' position:
The risk of establishment under Australian conditions is the one guiding the recommendations and is independent of conditions in other countries.

9.3 Import Risk Management

9.3.1 Pest surveillance (survey and monitoring)

Issue: 11
Mango Pulp Weevil has a high entry potential particularly given the fact that there is no evidence that the VHT treatment will control it. The detection reliability of 95% may result in significant quantities of infected fruit entering the Australian Market.

AQIS' position:
Note that fruit can only be sourced from an area after a survey to establish the pest is not present. In addition the fruit sampling at the packing point will add to that assurance! This is analogous to, but more stringent than how mangoes exported from Queensland are certified free of MSW.

9.3.2 Area freedom

Issue: 12
Additional monitoring surveys for area freedom for Guimaras Island should be carried out in November-December. In addition a more comprehensive survey to cover all relevant islands that export mangoes should be included.

AQIS' position:
Not considered necessary to survey in the second period, experience from the 1993 survey suggests no greater level of assurance was gained. Exports are only proposed from Guimaras Island at this time; additional surveys will be needed if other sources are proposed in the future.

9.3.3 Inspection efficacy

Issue: 13
Visual inspection alone is inadequate for the *Nephopterix* sp. (black borer) because eggs and larvae may be undetected.

AQIS' position:
It is agreed that eggs could be a problem to detect visually but are not likely on mature fruit according to the literature. Eggs are laid under the surface of fruit and so control by VHT is also likely, the temperature of 46^0C will be maintained here for much longer than 10 minutes. Larvae do much visual damage quickly and so are not likely to be missed by visual inspection; unlike MPW where there is no external sign of infestation nor any effect on developing fruit.

Issue: 14
The Red-banded caterpillar (*Noorda albizonalis*) is of highly significant economic importance and of particular concern to industry is the high entry potential. Larvae feed in the seed and, therefore detection

during any monitoring or surveying inspection procedure will need a destructive process. The effectiveness of a VHT treatment in killing the RBC is unknown also.

AQIS' position:
It is very unlikely to be in imported fruit due to the effect it has on developing fruit and the damage it causes to mature fruit. Inspection of mature fruit by non-destructive sampling is considered sufficient for this reason; unlike MPW where there is no external sign of infestation nor any effect on developing fruit.

9.4 Post-Harvest Management

9.4.1 Fruit transport

Issue: 15
There is need to critically analyse the distribution systems and protocols from production to treatment and shipping sites in the Philippines and the commitment to enforcing them from BPI.

AQIS' position:
Systems are in place in the Philippines already for the Japanese trade. AQIS will audit any protocols and procedures required by AQIS to ensure that these are effective.

9.4.2 Disinfestation treatments

Issue: 16
AQIS should seek evidence that VHT treatment does control Philippine fruit flies and any other fruit fly species that may be significant to the Australian industry.

AQIS' position:
The species present in the Philippines that attack mangoes are identified in the IRA and the VHT treatment is demonstrated as effective against those species.

Issue: 17
The time and temperature specified for vapour heat treatment is 46^0C for 10 minutes. This differs for that for Queensland Fruit Fly of 46.5^0C for 20 minutes or 47^0C for 15 minutes.

AQIS' position:
This is the regime shown and accepted to be effective against the *Bactrocera 'dorsalis'* complex and *B. cucurbitae* by Japan and the USA. It is true that the two species now identified as present in the Philippines, both siblings of *B. dorsalis* were not individually treated at first but this treatment has been used for mangoes to Japan without treatment failures and the treatment was reassessed against both species individually later.

Issue: 18

It appears that MPW is not controlled by VHT. Until a procedure can be put in place to guarantee 100% control entry should be refused.

AQIS' position:
The assurance that MPW will be absent from fruit rests on the absence of the pest from the source of the fruit, not the treatment.

9.4.3 Post treatment sampling

Issue: 19
Suggest using 'Up to 500 fruit to make up the sample may come from treated fruit culled during packing' in item 8, paragraph 2, line 2.

AQIS' position:
Agreed and amended to ensure treated fruit are sampled.

9.4.4 Post entry quarantine

Issue: 20
Restrictions on the movement of mango fruit into Western Australia from sources having MSW, mango leafhopper and mango scab under WA legislation should be recognised in the IRA.

AQIS' position:
Movement of fruit from ports of entry into other Australian states is under the control of state legislation not AQIS. Fruit is not permitted into WA from sources where these pests occur.

10. LIST OF RESPONDENTS

Agriculture Western Australia
Australian Horticultural Corporation
Bureau of Plant Industry, Department of Agriculture, Republic of the Philippines
Crops Division, Department of Agriculture, Fisheries and Forestry
Environment Australia, Biodiversity Group
Gin-Gin & District Fruit & Vegetable Growers Association
Horticultural Research & Development Corporation
Natural Resources and Environment, Victoria
New South Wales Agriculture
Northern Territory Department of Primary Industry and Fisheries
Primary Industries and Resources South Australia
Queensland Department of Primary Industries
Queensland Fruit and Vegetable Growers

11. RISK MANAGEMENT OPTIONS

TABLE 2 Risk Management for Pests of Quarantine Concern

Quarantine Pest	Common Name	Risk Management Options
Bactrocera cucurbitae (Colquillett)	melon fly	VHT of fruit to ensure core temperature is 46^0C for 10 minutes AND internal inspection of 600 fruit from each lot.
Bactrocera occipitalis (Bezzi)	fruit fly	VHT of fruit to ensure core temperature is 46^0C for 10 minutes AND internal inspection of 600 fruit from each lot.
Bactrocera philippinensis Drew & Hancock	Philippine fruit fly	VHT of fruit to ensure core temperature is 46^0C for 10 minutes AND internal inspection of 600 fruit from each lot.
Nephopterix sp. Hubner	black borer	Internal inspection of 600 fruit from each lot.
Noorda albizonalis Hampson	red-banded borer	Internal inspection of 600 fruit from each lot.
Planococcus lilacinus (Cockerell)	coffee mealybug	External inspection of 600 fruit from each lot.
Sternochetus frigidus Fabricius	mango pulp weevil	From an area where area freedom has been established to AQIS' satisfaction AND internal inspection of 600 fruit from each lot.
Sternochetus mangiferae Fabricius	mango seed weevil	not permitted entry to WA
Elsinoe mangiferae	mango scab	not permitted entry to WA

Risk management procedures should be selected to meet the identified risk. Risk management procedures can be identified and selected so that the principle of minimum impact is respected, therefore in relevant and appropriate cases a risk management option can be selected that addresses the highest risk pest thereby removing the risk of introduction of all other pests in the pathway.

12. REFERENCES

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