Ministry for Primary Industries
Manatū Ahu Matua

Risk Management Proposal:

Equivalent phytosanitary treatment for regulated pests associated with fresh mangoes (*Mangifera indica*) from Viet Nam

FOR PUBLIC CONSULTATION

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Plant Imports
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Purpose

1. The purpose of this document is to:
   - Outline the proposed amendment to the import requirements for fresh mangoes (*Mangifera indica*) from Viet Nam, for the management of fruit flies (Diptera: Tephriditae) and other regulated pests; and
   - To seek stakeholder feedback on the proposed amendment to import requirements.

Background

2. The Ministry for Primary Industries (MPI) issued the import health standard (IHS) for fresh mangoes from Viet Nam in December 2011.

3. The current IHS requires mangoes to be treated for fruit flies (Diptera: Tephriditae) and other regulated pests, by vapour heat treatment (VHT) at a fruit pulp temperature at or above 46.5°C for at least 30 minutes or, by irradiation at a minimum absorbed dose of 400 Gy.

4. The National Plant Protection Organisation (NPPO) of Viet Nam, the Ministry of Agriculture and Rural Development, Plant Quarantine Division (MARD PPD), has requested that MPI consider VHT at a fruit pulp temperature at or above 47°C for at least 20 minutes as equivalent to the current IHS requirements.

COMMODITY DESCRIPTION

5. Fresh *Mangifera indica* L. (Sapindales: Anacardiaceae) for human consumption is defined as commercially produced mango fruits with skin, flesh and seed, with a small portion of stem attached, but not including leaves.

TRADE

6. A small number of consignments of mangoes from Viet Nam have been imported into New Zealand since the IHS was issued in December 2011. These mangoes were all irradiated at the dosage specified in the IHS (http://www.biosecurity.govt.nz/files/ihs/mango-vie.pdf).

7. As of January 2014, no vapour heat treated mangoes have been imported into New Zealand from Viet Nam.

INTERNATIONAL SETTING

8. Where possible, phytosanitary measures are aligned with international standards, guidelines, and recommendations as per New Zealand's obligations under Article 3.1 of the World Trade Organisation (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement, WTO 1995) and section 23(4)(c) of the Biosecurity Act 1993.

9. The SPS Agreement states that phytosanitary measures must not discriminate unfairly between countries or between imported or domestically produced goods, and where there is a choice of phytosanitary measures to reduce risk to an acceptable level, WTO members must select the least trade restrictive measure.

Objective

10. The objective of the proposed measure is to effectively manage the risk of fruit flies and other regulated pests associated with the importation of fresh mangoes from Viet Nam in a way that is consistent with New Zealand's domestic legislation (Biosecurity Act 1993) and international obligations.

Assessment

11. MARD PPD has worked closely with the Government of Japan (Japan International Cooperation Agency, JICA) on the development of efficacious vapour heat treatments for mangoes against *Bactrocera dorsalis* (Oriental fruit fly), *B. cucurbitae* (melon fly), *B. correcta* (guava fly) and *B. carambolae* (carambola fly).

12. The data provided to MPI by MARD PPD were assessed against the Asia Pacific Plant Protection Committee, Regional Standard for Phytosanitary Measures (APPPC RSPM) 1:*Guidelines for the development of heat disinfestation treatments of fruit fly host commodities* (2004) and the International Standard for Phytosanitary Measures (ISPM) 24: *Guidelines for the determination and recognition of equivalence for phytosanitary measures* (2005).

13. The critical information for determining that the proposed treatment option (≥47°C at ≥20 minutes) is efficacious and equivalent to the current treatment option (≥46.5°C at ≥30 minutes) is:

Regulated pests associated with Vietnamese mango

a) The IHS for mangoes from Viet Nam identifies six species of fruit fly associated with mangoes from Viet Nam. These are *B. dorsalis B. cucurbitae*, *B. correcta B. tau*, *B. tuberculata* and *B. zonata*. Other externally feeding arthropods and two species of fungi are also listed in Part E of the IHS http://www.biosecurity.govt.nz/imports/plants/standards/mango-vie.htm.

b) Efficacy data were provided by MARD PPD for *B. dorsalis*, *B. cucurbitae*, *B. correcta* and *B. carambolae*[1] as representatives of fruit fly species associated with mangoes.

Experimental insects

c) Colonies of *B. dorsalis*, *B. cucurbitae*, *B. correcta* and *B. carambolae* used in experiments were established from adult fruit flies recovered from field infested fruits of different species and collected from multiple locations in Viet Nam;

d) Colonies were replenished with wild fruit flies annually. Flies were reared on a standard yeast and granulated sugar or wheat bran medium depending on stage of development, and provided with water;

e) Developmental and adult emergence rates were determined for each species of fruit fly under colony conditions (MARD PPD 2013, 2008);

Species	Development time (egg to adult emergence)	Emergence rate (adults from eggs)
B. dorsalis	16.5 days	46.0%
B. cucurbitae	14.6 days	80.2%
B. correcta	16.3 days	69.1%
B. carambolae	15.1 days	56.6%

[1] *Bactrocera carambolae* is presently not on the pest list for mangoes from Viet Nam and will be included as part of this proposed amendment to include an equivalent treatment. The species is an economically important pest that belongs to the *B. dorsalis* species complex (Clarke *et al.* 2005).

Experimental fruit

f) Mangoes used in the experimental trials were of commercial export size (≈330-440g), grade, ripeness and variety (Cat Chu);

Infestation of fruit

g) Pin holes were made in the mango fruit peel to induce adult oviposition;

h) Mango fruit were placed in cages of 15,000 mature fruit flies for one hour;

Determination of the most tolerant fruit fly species and life stage

i) Heat tolerance testing using small-scale VHT trials on infested fruit showed that 1st instar *B. dorsalis* larvae were more heat tolerant than all other species and life stages, followed by *B. correcta* mature eggs.

Small scale trials

j) In small scale VHT trials, 100% mortality of 3,000 1st instar *B. dorsalis* larvae and 3,000 *B. correcta* mature eggs was achieved at a fruit core temperature of 47°C for 15 minutes.

Large scale confirmatory trials

k) Large scale VHT trials using fruit infested with a total of 40,694 1st instar *B. dorsalis* larvae and 43,732 *B. correcta* mature eggs confirmed that a fruit core temperature of 47°C for 20 minutes resulted in 100% mortality of fruit fly species and life stages. The large scale trials simulated commercial treatment conditions.

l) Untreated controls and four replications were used throughout small and large scale trials; corrections were made for control mortality.

14. MPI identified three additional fruit fly species as being associated with mangoes from Viet Nam. These species are *B. tau*, *B. tuberculata* and *B. zonata.* These species were not specifically tested by MARD PPD, however the temperature and time is within the range of MPI-approved treatments for other fruit flies species associated with mangoes from other countries (http://www.biosecurity.govt.nz/files/ihs/152-02.pdf).

15. The proposed treatment is supported by pest management, pest exclusion, post-harvest procedures to remove externally feeding arthropods, and official verification activities as described in the risk management proposal to support the issuance of the IHS in December 2011(MPI 2011b) (http://www.biosecurity.govt.nz/files/biosec/consult/draft-ihs-mango-vietnam-rmp.pdf).

16. MPI will monitor interceptions of viable regulated organisms and the appropriateness/ effectiveness of the proposed new phytosanitary measure for mangoes from Viet Nam. Currently, organisms have their regulatory status classified on the MPI Biosecurity Organisms Register for Imported Commodities (BORIC) (http://www.mpi.govt.nz/biosecurity/pests-diseases/registerslists/boric/).

Feasibility & practicality of measures

17. Viet Nam has been exporting VHT dragon fruit to Korea and Japan for a number of years and has the same systems in place to implement the proposed treatment temperature and time for mangoes.

18. MARD PPD has assessed mango quality resulting from the increase in the proposed VHT temperature. The key parameters assessed were physical appearance, evaluation of fruit, weight loss, sugar and acid content, peel colour, firmness and flavour of fruit. Uniformity

in fruit ripeness was identified as the key factor for ensuring quality is maintained during treatment and post-treatment.

Proposed IHS requirements

19. Based on the evaluation of measures for the management of regulated arthropod pests the following [existing and] new requirements for mangoes (Commodity Sub-Class: Fresh Fruit/ Vegetables) from Viet Nam are proposed:

LIST OF TREATMENT OPTIONS (MPI/MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT OFFICIAL ASSURANCE PROGRAMME)

Treatment	Specification	Commodity
Vapour heat treatment	Fruit pulp temperature raised from ambient to 46.5°C or above for at least 30 minutes OR Fruit pulp temperature raised from ambient to 47°C or above for at least 20 minutes	Mango (*Mangifera indica*)
Irradiation	Irradiated with a minimum dose of 400 Gy	Mango (*Mangifera indica*)

References

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