Ministry for Primary Industries
Manatū Ahu Matua

Risk Management Proposal

(Equivalence proposal) Irradiation of fresh *Litchi chinensis* (lychee) and *Dimocarpus longan* (longan) for human consumption from Thailand to New Zealand

FOR PUBLIC CONSULTATION

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Purpose

1. The purpose of this document is to:
   a) Summarise the known phytosanitary risks associated with fresh litchi and longan from Thailand for human consumption;
   b) Summarise how irradiation can effectively manage risk(s) and is equivalent to current phytosanitary measures;
   c) Outline the feasibility and practicality of implementation of the proposed measure;
   d) Seek stakeholder feedback on the proposed phytosanitary measure for the purpose of consultation with interested parties to amend the import health standard (IHS) 152.02: *Importation and clearance of fresh fruit and vegetables into New Zealand* (2013a).

Background

2. New Zealand has imported litchi and longan from Thailand since August 2005 using vapour heat treatment (VHT) or cold disinfestation as a post harvest treatments for fruit flies.

3. The Department of Agriculture (DOA), Thailand has requested that MPI considers the use of irradiation as a phytosanitary measure for the treatment of fruit flies associated with lychee and longan. The proposed irradiation treatment would offer an alternative measure to the existing treatments available for the export of fresh lychee and longan from Thailand to New Zealand.

COMMODITY DESCRIPTIONS

4. The commodity description "lychee" for human consumption is defined as commercially produced lychee (*Litchi chinensis*) with calyx and peduncle, but without stems, leaves, roots or any other plant parts.

5. The commodity description "longan" for human consumption is defined as commercially produced longan (*Dimocarpus longan*), with a maximum of 15cm panicle attached to the fruit, but without stems leaves roots or any other plant parts.

TRADE

6. Fresh lychee and longan from Thailand is typically imported between April and August. As New Zealand does not grow lychee and longan, these commodities are imported into New Zealand for the domestic market. Fresh lychee can also be imported from Australia, New Caledonia and Taiwan. Thailand is the only country currently approved to export fresh longans to New Zealand.

CURRENT REQUIREMENTS FOR FRUIT FLY

7. The current phytosanitary measures for lychee and longan from Thailand are specified in the respective import health standards linked to MPI IHS 152.02 (MPI, 2013a).

8. Lychee and longan must be either vapour heat treated or cold treated for fruit fly at specified rates to ensure pre-export requirements are met. These requirements are summarised in Table 1.

Table 1: Summary of current treatment specifications for lychee and longan

Commodity	Treatment	Specification
Lychee and Longan	Vapour heat treatment (VHT)	Lychees and longans must be treated with vapour heat and the temperature must be raised from ambient to 47°C or greater and held for a minimum of 20 minutes.
Lychee	Cold disinfestation	Prior to arrival in New Zealand, the core temperature of the fruit must be held continuously at one of the following temperature/time combinations: Fruit pulp temperature held at: 0ºC or below for 10 days 0.56ºC or below for 11 days 1.11ºC or below for 12 days 1.67ºC or below for 14 days
Longan	Cold disinfestation	Prior to arrival in New Zealand, the core temperature of the fruit must be held continuously at one of the following temperature/time combinations: Fruit pulp temperature held at: 0.99ºC or below for 13 days 1.38°C or below for 18 days

SOURCE INFORMATION

9. The following information was used to assess irradiation as an appropriate measure to manage the entry and establishment into New Zealand of regulated pests associated with lychee and longan:

   a) MPI IHS 152.02 (2013a);
   b) MPI IHS Lychee (*Litchi chinensis*) from Thailand (2005a);
   c) MPI IHS Longan (*Dimocarpus longan*) from Thailand (2005b);
   d) ISPM 18: Guidelines for the use of irradiation as a phytosanitary measure (IPPC, 2011a);
   e) ISPM 24: Guidelines for the determination and recognition of equivalence of phytosanitary measures (IPPC, 2005);
   f) ISPM 28: Phytosanitary treatments for regulated pests (IPPC, 2007);
   g) ISPM 28 – Annex 04: Irradiation treatment for *Bactrocera jarvisi* (IPPC, 2009a);
   h) ISPM 28 – Annex 05: Irradiation treatment for *Bactrocera tryoni* (IPPC, 2009b);
   i) ISPM 28 – Annex 07: Irradiation treatment for fruit flies of the family Tephritidae (generic) (IPPC, 2009c);
   j) ISPM 28 – Annex 14: Irradiation treatment for *Ceratitis capitata* (IPPC, 2011b);
   k) MPI Interception records of lychee and longan from Thailand to New Zealand from 2005-2013;
   l) Irradiation commodity import health standards (MAF, 2006; 2009a; 2009b; 2009c; MPI, 2012; MPI 2013c ; MPI 2013d);

m) Existing lychee import health standards (MAF; 2000 ; MAF 2005a; MAF 2007b; 2009a);

n) Import risk analysis: *Litchi chinensis* Fresh Fruit from Taiwan (MAF 2007a)

o) Import risk analysis: *Litchi chinensis* Fresh Fruit from Australia (MAF 2008)

p) Treatment manual (USDA, 2012);

q) Relevant literature and database searches.

INTERNATIONAL SETTING

10. 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.

Objective

11. To ensure the known phytosanitary risks associated with irradiated lychees and longans from Thailand are managed and are consistent with New Zealand's domestic legislation and international obligations.

Summary of Risk

REGULATED PESTS

12. Lychees and longans are known to be hosts of economically significant fruit fly species that are present in Thailand (Table 2).

Table 2: Fruit fly pests of lychees and longans present in Thailand

Commodity	Fruit fly scientific name	Fruit fly common name
Lychee	*Bactrocera cucurbitae* *Bactrocera dorsalis*	Melon fly Oriental fruit fly
Longan	*Bactrocera correcta* *Bactrocera dorsalis*	Guava fruit fly Oriental fruit fly

13. Tephritidae fruit flies (Table 2) are internally feeding organisms and some species are considered high risk, requiring specific phytosanitary measures. Any incursions of live fruit fly could disrupt trade and potentially mean significant economic losses for New Zealand exporters of fruit fly host material.

14. Lychee and longan are also known to be hosts of *Conogethes punctiferalis* (yellow peach moth) which is present in Thailand.

15. Other regulated pests associated with lychees and longans are described in Appendix 1 and include other pests know to be associated with the commodities. A list of regulated and non-regulated pests for New Zealand can be found at the MPI Biosecurity Organisms Register for Imported Commodities (BORIC) (MPI, 2013b).

INTERCEPTION HISTORY

16. Since trade began with Thailand in 2005, an estimated 27 consignments of lychees and 40 consignments of longans have been imported into New Zealand. There have been no live interceptions of fruit flies detected on either of these pathways.

Risk Management

17. The Department of Agriculture (DOA), Thailand has requested MPI approve irradiation as an equivalent phytosanitary measure for economically significant fruit flies as an alternative to the existing phytosanitary measures (VHT and cold disinfestation).

    It is proposed that lychees and longans be treated at the following rate:

    - Irradiation at 250Gy for fruit flies and *C. punctiferalis*.

18. All fruit exported from Thailand are currently grown in registered orchards which incorporates an integrated pest management programme. Thailand will continue standard commercial production practices including pre-harvest and post-harvest handling practices and other phytosanitary measures to commercially[1] produce lychees and longans for export to New Zealand. It is proposed these practices combined with pre-treatment phytosanitary inspection and irradiation and other MPI requirements are used to manage the risk to New Zealand posed by economically significant fruit flies and other regulated pests associated with lychees and longans from Thailand.

IRRADIATION TREATMENT

19. Irradiation is recognised internationally as an efficacious phytosanitary measure for Tephritidae fruit flies in accordance with ISPM 28 - Annex 7, where a treatment with a minimum absorbed dose of 150Gy to Tephritidae eggs and larvae is known to prevent adult fruit fly emergence from pupae (99.9968% efficacy at the 95% confidence level) (IPPC, 2009c). Irradiation of *C. punctiferalis* at 250Gy is considered efficacious (Boshra & Mikhaiel, 2006; IPPC, 2009c) and is consistent with other MPI IHSs (MPI, 2013a).

20. MPI requires an additional declaration to the phytosanitary certificate stating consignments of lychees or longans are "inspected in accordance with appropriate official procedures and found to be free from regulated pests specified by NZMPI …". Phytosanitary inspection is conducted prior to treatment to assist DOA in determining the appropriate minimum absorbed dose of irradiation required for the specific commodity/pest. MPI proposes that DOA undertakes actions for pests detected at the pre treatment phytosanitary inspection (Table 3).

21. A minimum absorbed dose of 400Gy is considered to be effective to prevent the introduction and spread of many regulated pests (Follett, 2009), including economically significant fruit flies (IPPC, 2009c), other Diptera (IPPC, 2009c), Lepidoptera juvenile lifestages (Boshra & Mikhaiel, 2006; IPPC, 2009c), Coleoptera (Mansour & Al-Bacheer, 1995; Tilton *et al.*, 1966), Hemiptera (Halfhill, 1988; Hara *et al*., 2002; The *et al*., 2012), Thysanoptera (Dohino *et al*., 1996) and Acarina juvenile lifestages (IAEA-TECDOC 1427, 2004)

[1] Lychee and longan for export from Thailand to New Zealand must be produced commercially; this ensures fruit are produced in a way that reduces the risk of pathogen infection and pest infestation, particularly with regard to economically important species of fruit fly.

22. The known exceptions for arthropods that are not effectively treated (killed or sterilized) by a minimum absorbed dose of 400Gy include various life stages of mite species (Boczek *et al*. 1985, Goodwin *et al.* 1990, Ignatowicz 1992, IAEA-TECDOC-1427 2004) and pupae and adults of some Lepidoptera (Follett 2009).

Table 3: Actions for pests detected during DOA pre-treatment phytosanitary inspection

Pests detected	Reference	Actions by DOA
Fruit flies of economic importance and *Conogethes punctiferalis*	Table 2 ; IHS Thailand lychee and longan pest lists	Irradiate at a minimum dose of 250 Gy (default treatment for fruit flies and *Conogethes punctiferalis*)
All regulated plant pathogens	IHS Thailand lychee and longan pest lists[2]	Reject lot, not eligible for export
Regulated vectors	IHS Thailand lychee & longan pest lists; BORIC	Reject lot, not eligible for export OR Treat with methyl bromide fumigation
Regulated arthropods (regulated organisms not specified on pest list, excluding Lepidoptera pupae and adults and other Acari)	IHS Thailand lychee & longan pest lists; BORIC;	Resort and resubmit for phytosanitary inspection. If nil detections, then irradiate OR Irradiate at a minimum absorbed dose of 400Gy
Non-regulated pests OR None detected	IHS Thailand lychee & longan pest lists; BORIC	Irradiate at a minimum absorbed dose of 250Gy (default treatment for fruit flies and *Conogethes punctiferalis)*

23. A minimum absorbed dose of 400Gy is considered to be effective to prevent the introduction and spread of regulated pests associated with lychee and longan (Follett, 2009), including economically significant fruit flies (IPPC, 2009c), other Diptera (IPPC, 2009c), Lepidoptera juvenile lifestages (Boshra & Mikhaiel, 2006; IPPC, 2009c), Coleoptera (Mansour & Al-Bacheer, 1995; Tilton *et al.*, 1966), Hemiptera (Halfhill, 1988; Hara *et al*., 2002; The *et al*., 2012), Thysanoptera (Dohino *et al*., 1996) and Acarina (Boczek *et al*., 1985; IAEA-TECDOC 1427, 2004; Ignatowicz, 1992;).

24. After treatment all product must be identified as "treated" and as produce destined for export to New Zealand. New Zealand has mandatory labelling requirements for irradiated produce and as such, the irradiated lychee and longan must be labelled in accordance with Food Standards Australia New Zealand (FSANZ). The FSANZ requirements[3], are applicable for irradiated lychees and longans for export to New Zealand.

25. Treatment facilities will be registered and audited by DOA to irradiate lychee and longan for export to New Zealand. Assessment and verification of facilities by MPI will be conducted on approval of irradiation for new commodities; additional audits may be conducted where non-compliance with the IHS and/or OAP are detected.

[2] http://www.biosecurity.govt.nz/files/ihs/litchi-th.pdf and http://www.biosecurity.govt.nz/files/ihs/longan-th.pdf

PRODUCT SECURITY & TRACEABILITY

26. Irradiated lychee and longan for export to New Zealand will be kept secure and segregated from untreated commodities during post harvest handling practices, phytosanitary inspection and treatment to prevent cross contamination, re-infestation and potential substitution of produce.

PATHWAY MONITORING

27. MPI will monitor interceptions of all regulated pests including hitchhikers and the appropriateness/effectiveness of phytosanitary measures on the commencement of trade in irradiated lychee and longan. Hitchhiker pests have their regulatory status classified on the MPI Biosecurity Organisms Register for Imported Commodities (BORIC) (MPI, 2013b).

Phytosanitary inspection and certification by DOA

28. All consignments of lychee and longan must be sampled and visually inspected for regulated arthropod pests to ensure irradiation has or will manage risk prior to issuance of a phytosanitary certificate by DOA.

29. Where a regulated arthropod pest is detected on the commodity and irradiation is the intended pre-export phytosanitary treatment, appropriate irradiation doseages for the pest must be reconciled or applied by DOA, as per Table 3. Alternative approved corrective actions may be conducted (e.g. methyl bromide fumigation), or the fresh produce will not be exported to New Zealand. When no regulated pests are detected or corrective actions have taken place and all requirements of the IHS have been met a phytosanitary certificate will be issued, which should be in accordance with ISPM 7: Phytosanitary certification system (IPPC, 2011c) and ISPM 12: Phytosanitary certificates (IPPC, 2011d).

Verification on arrival in New Zealand

30. MPI will inspect documentation on arrival in New Zealand. In addition, MPI may inspect a sample from each lot on arrival in New Zealand to verify requirements of the IHS have been met. The sampling procedure will be in accordance with section 4.4 of the MPI IHS 152.02: *Importation and clearance of fresh fruit and vegetables into New Zealand* (2013a). In addition, testing (where available) of a sample from each lot may be conducted to verify the product has been treated in accordance with requirements.

ACTIONS UNDERTAKEN UPON INTERCEPTION/DETECTION OF PESTS/CONTAMINANTS

31. In accordance with section 8.3 of ISPM 18: Guidelines for the use of irradiation as a phytosanitary measure (IPPC, 2011a) when mortality is not the required response, the detection of live stages of target pests in import inspection should not be considered to represent treatment failure resulting in non-compliance unless evidence exists to indicate that the integrity of the treatment system was inadequate.

32. MPI reserves the right for analyses to be conducted on the detected regulated pest to verify irradiation treatment efficacy.

Feasibility & Practicality of Measures

33. Irradiation is currently an approved measure the export of lychee, mango, papaya, tomato and capsicums from Australia, mango from USA (Hawaii) and Vietnam (MPI, 2013a), respectively.

34. DOA have two approved irradiation facilities in place for irradiating fresh produce for export New Zealand and other export markets. The irradiation treatment facilities are calibrated in accordance with international standards:

a) ISO/ASTM 51261: *Selection and Calibration of Dosimetry Systems for Radiation Processing* (ISO, 2002);
b) ISO/ASTM 51204: *"Dosimetry in Gamma Irradiation Facilities for Food Processing* (ISO, 2004);
c) ASTM F1355: *Irradiation of Fresh Fruits as a Phytosanitary Treatment* (ASTM, 2006);
d) ISPM 18: *Guidelines for the use of irradiation as a phytosanitary measure* (IPPC, 2011a).

Proposed IHS requirements

35. The proposed phytosanitary measures on the lychees and longans export pathways from Thailand are summarised in Table 4. Lychees and longans must be inspected and treated in accordance with VHT, cold disinfestation or irradiation requirements to ensure pre-export requirements are met for the export of these fruit fly host commodities to New Zealand.

Table 4: Summary of proposed treatment specifications for lychees and longans

Commodity	Treatment	Specification
Lychee and Longan	Vapour heat treatment (VHT)	Lychees and longans must be treated with vapour heat and the temperature must be raised from ambient to 47°C or greater and held for a minimum of 20 minutes.
Lychee	Cold disinfestation	Prior to arrival in New Zealand, the core temperature of the fruit must be held continuously at one of the following temperature/time combinations: Fruit pulp temperature held at: 0ºC or below for 10 days 0.56ºC or below for 11 days 1.11ºC or below for 12 days 1.67ºC or below for 14 days
Longan	Cold disinfestation	Prior to arrival in New Zealand, the core temperature of the fruit must be held continuously at one of the following temperature/time combinations: Fruit pulp temperature held at: 0.99ºC or below for 13 days 1.38°C or below for 18 days
Lychee and Longan	Irradiation	Irradiation with a minimum dose of 250 Gy

36. The proposed phytosanitary certificate additional declarations for export of lychees and longans are found in Appendix 2.

References

ASTM (2006) American Society for Testing and Materials, ASTM F1355: *Irradiation of Fresh Fruits as a Phytosanitary Treatment.* Accessed online http://www.astm.org/

Boczek, J., Jaminska, D., Bruce, W. A. & Davis, R. (1985) Effect of gamma radiation on *Rhizoglyphus echinopus* (Fumouze and Robin) and *Aleuroglyphus ovatus* (Troupeau) (Acari:Acaridae). *Journal of Entomological Science*, 20: 115-120.

Boshra, S. A. & Mikhaiel, A. A. (2006) Effect of gamma irradiation on pupal stage of *Ephestia calidella* (Guenee). *Journal of Stored Products Research*, 42: 457-467

Follett, P.A (2009) Generic Quarantine Radiation Treatment; The Next Steps. *Journal of Economic Entomology*, 102: 1399-1406

FSANZ (2013) Food Standards Australia New Zealand. Australia New Zealand Food Standards Code 1.5.3 – Irradiation of Food. Accessed online http://www.foodstandards.gov.au/foodstandards/foodstandardscode.cfm

Goodwin, S. & Wellham T. M. (1990) Gamma irradiation for disinfestation of cut flowers infested by two-spotted spider mite (Acarina: Tetranychidae). *Journal of Economic Entomology*: 1455-1458.

Halfhill, J. E. (1988) Irradiation disinfestation of asparagus spears contaminated with *Brachycorynella asparagi* (Mordvilko) (Homoptera: Aphididae). *Journal of Economic Entomology*, 81: 873-876.

Hara, A. H., Yalemar, J. A., Jang, E. B. & Moy J. H. (2002) Irradiation as a possible quarantine treatment for green scale *Coccus viridis* (Green) (Homoptera: Coccidae). *Postharvest Biology and Technology*, 25: 349-358.

Ignatowicz, S. (1992) Irradiation as a quarantine treatment for agricultural products infested by Acarid mites (Acarina: Acaridae). *In* Use of irradiation as a quarantine treatment of food and agricultural commodities. Vienna, International Atomic Energy Agency: pp. 157-173.

IAEA-TECDOC-1427 (2004) Irradiation as a phytosanitary treatment of food and agricultural commodities. Results of a Coordinated Research Project 1998-2002

IPPC (2005) ISPM 24: Guidelines for the determination and recognition of equivalence of phytosanitary measures. Accessed online https://www.ippc.int/file_uploaded/1323946244_ISPM_24_2005_En_2011-11-29_Refor.pdf

IPPC (2007) ISPM 28: Phytosanitary treatments for regulated pests. Accessed online https://www.ippc.int/file_uploaded/1323949527_ISPM_28_2007_En_2011-11-29_Refor.pdf

IPPC (2009a) ISPM 28 - Annex 04: Irradiation treatment for *Bactrocera jarvisi.* Accessed online https://www.ippc.int/file_uploaded/1323950176_PT_04_2009_En_2011-12-01_Reforma.pdf

IPPC (2009b) ISPM 28 – Annex 05: Irradiation treatment for *Bactrocera tryoni*. Accessed online https://www.ippc.int/file_uploaded/1323950176_PT_05_2009_En_2011-12-01_Reforma.pdf

IPPC (2009c) ISPM 28 – Annex 07: Irradiation treatment for fruit flies of the family Tephritidae (generic). Accessed online https://www.ippc.int/file_uploaded/1323950176_PT_07_2009_En_2011-12-01_Reforma.pdf

IPPC (2011a) ISPM 18: Guidelines for the use of irradiation as a phytosanitary measure. Accessed online https://www.ippc.int/file_uploaded/1323945591_ISPM_18_2003_En_2011-11-29_Refor.pdf

IPPC (2011b) ISPM 28 – Annex 14: Irradiation treatment for *Ceratitis capitata.* Accessed online https://www.ippc.int/file_uploaded/1323951955_PT_14_2011_En_2011-12-01_Reforma.pdf

IPPC (2011c) ISPM 7 - Export Certification System. Accessed online https://www.ippc.int/file_uploaded/1337674518_ISPM_07_2011_En_2012-05-21.pdf

IPPC (2011d) ISPM 12 – Phytosanitary certificates. Accessed online http://www.ippc.int/file_uploaded/1323945276_ISPM_12_2011_En_2011-11-29_Refor.pdf

ISO (2002) International Organisation for Standardization, ISO/ASTM 51261: *Selection and Calibration of Dosimetry Systems for Radiation Processing.* Accessed online http://www.iso.org/iso/home.html

ISO (2004) International Organisation for Standardization, ISO/ASTM 51204: *"Dosimetry in Gamma Irradiation Facilities for Food Processing.* Accessed online http://www.iso.org/iso/home.html

MAF (2000) IHS 152.02: Lychee, *Litchi chinensis* from New Caledonia. Accessed online http://www.biosecurity.govt.nz/files/ihs/litchi-nc.pdf

MAF (2005a) IHS 152.02: Lychee, *Litchi chinensis* from Thailand. Accessed online http://www.biosecurity.govt.nz/files/ihs/litchi-th.pdf

MAF (2005b) IHS 152.02: Longan, *Dimocarpus longan* from Thailand. Accessed online http://www.biosecurity.govt.nz/files/ihs/longan-th.pdf

MAF (2006) IHS 152.02: Papaya, *Carica papaya* from the United States of America – State of Hawaii. Accessed online http://www.biosecurity.govt.nz/files/ihs/papaya-us-hi.pdf

MAF (2007a) Import Risk Analysis: *Litchi chinensis* (Litchi) fresh fruit from Taiwan. Accessed online http://www.biosecurity.govt.nz/files/regs/imports/risk/litchee-taiwan-ra.pdf

MAF (2007b) MAF (2005a) IHS 152.02: Lychee, *Litchi chinensis* from Taiwan. Accessed online http://www.biosecurity.govt.nz/files/ihs/litchi-tw.pdf

MAF (2008) Import Risk Analysis: *Litchi chinensis* (Litchi) fresh fruit from Australia. Accessed online http://www.biosecurity.govt.nz/files/regs/imports/risk/aus-litchi-ra.pdf

MAF (2009a) IHS 152.02: Litchi, *Litchi chinensis* from Australia. Accessed online http://www.biosecurity.govt.nz/files/ihs/litchi-au.pdf

MAF (2009b) IHS 152.02: Mango, *Mangifera indica* from Australia. Accessed online http://www.biosecurity.govt.nz/files/ihs/mango-au.pdf

MAF (2009c) IHS 152.02: Papaya, *Carica papaya* from Australia. Accessed online http://www.biosecurity.govt.nz/files/ihs/papaya-au.pdf

Mansour, M. Y. & Al-Bacheer, M. (1995) Gamma irradiation as a disinfestation and quarantine treatment for faba bean seeds infested with *Bruchus dentipes* Baudi (Col., Bruchidae). *Journal of Applied Entomology*, 119(9): 631-636

MPI (2012) IHS 152.02: Mango, *Mangifera indica* from Vietnam. Accessed online http://www.biosecurity.govt.nz/files/ihs/mango-vie.pdf

MPI (2013a) IHS 152.02: *Importation and clearance of fresh fruit and vegetables into New Zealand.* Accessed online http://www.biosecurity.govt.nz/files/ihs/152-02.pdf

MPI (2013b) Biosecurity Organisms Register for Imported Commodities (BORIC). Accessed online http://www.maf.govt.nz/biosecurity-animal-welfare/pests-diseases/boric.aspx

MPI (2013c) IHS 152.02: Capsicum, *Capsicum annuum* from Australia. Accessed online http://www.biosecurity.govt.nz/files/ihs/capsicum-au.pdf

MPI (2013d) IHS 152.02: Tomato, *Lycopersicon esculentum* from Australia. Accessed online http://www.biosecurity.govt.nz/files/ihs/tomato-au.pdf

The, D. T., Khanh, N. T., Lang, V. T. K, Chung, C. V, An, T. T. T. & Thi, N. H. (2012) Effects of gamma irradiation on different stages of mealybug Dysmicoccus neobrevipes (Hemiptera: Pseudococcidae). *Radiation Physics and Chemistry*, 81: 97-100.

Tilton, E. W., Burkholder, W. E. & Cogburn, R. R. (1966) Effects of gamma radiation on *Rhyzopertha dominica*, *Sitophilus oryzae*, *Tribolium confusum*, and *Lasioderma serricorne*. Journal of Economic Entomology 59: 1363-1368.

USDA (2012) Treatment Manual 3 - Nonchemical Treatments: Irradiation. Accessed online http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/treatment.pdf

Waite, G K; Hwang, J S (2002) Pests of litchi and longan *In*: Peña, J E; Sharp, J L Wysoki, M (Eds.) *Tropical Fruit Pests and Pollinators: biology, economic importance, natural enemies and control*. CABI Publishing Wallingford, UK 331-359 (viewed as e-book at: http://books.google.co.nz/books?id=t_BSs0hrAPAC&pg=PA358&dq=Aceria+litchii&hl=en&sa=X&ei=kQVCUvCgINHVkAXLgoGAAw&ved=0CC8Q6AEwAA#v=onepage&q=Aceria%20litchii&f=false

WTO (1995) World Trade Organisation - Agreement on the application of Sanitary and Phytosanitary Measures. Accessed online http://www.worldtradelaw.net/uragreements/spsagreement.pdf

Appendix 1: Regulated pest lists

Pests are regulated on the commodity if they are:

a) present in the exporting country and absent from New Zealand (or under official control), and
b) likely to be present on the pathway if the risk is unmitigated, or
c) known to be associated with the commodity (as per previous risk analyses), and
d) their hosts include species which are present in New Zealand, and
e) they are climatically able to establish in New Zealand, and/or
f) they are likely to cause high economic impacts to New Zealand (e.g. fruit fly).

Table 8: Fresh lychee, *Litchi chinensis* from Thailand regulated pest list

Scientific name	Organism type	Common name	Actions on interception
Meliola eupaniae-majoris	Fungi	sooty mould	2
Peronophythora litchii	Fungi	downy blossom blight	2
Phytophthora palmivora	Fungi	black rot	2
Achaea janata	Insect	castor oil looper	2 or 4
Aleurocanthus woglumi	Insect	citrus blackfly	2 or 4
Aonidiella orientalis	Insect	oriental red scale	2 or 4
Bactrocera cucurbitae	Insect	melon fly	3 or 4
Bactrocera dorsalis	Insect	Oriental fruit fly	3 or 4
Ceroplastes pseudoceriferus	Insect	horned wax scale	2 or 4
Ceroplastes rubens	Insect	pink wax scale	2 or 4
Chrysomphalus aonidum	Insect	Florida red scale	2 or 4
Chrysomphalus dictyospermi	Insect	Spanish red scale	2 or 4
Coccus viridis	Insect	soft green scale	2 or 4
Conogethes punctiferalis	Insect	yellow peach moth	2a or 4
Conopomorpha cramerella	Insect	cocoa pod borer	2 or 4
Conopomorpha litchiella	Insect	litchi leafminer	2 or 4
Conopomorpha sinensis	Insect	litchi fruit borer	2 or 4
Cryptophlebia ombrodelta	Insect	macadamia nut borer	2 or 4
Deudorix epijarbas	Insect	Cornelian butterfly	2 or 4
Dudua aprobola	Insect	brown tortrix	2 or 4
Eublemma brachygonia	Insect	flower caterpillar	2 or 4
Eublemma versicolor	Insect	flower caterpillar	2 or 4
Eudocima fullonia	Insect	fruit-piercing moth	2 or 4
Eudocima salaminia	Insect	fruit-piercing moth	2 or 4
Ferrisia virgata	Insect	guava mealybug	2 or 4
Henosepilachna vigintioctopunctata	Insect	hadda beetle	2 or 4
Icerya seychellarum	Insect	Okada cottony-cushion scale	2 or 4
Leptoglossus gonagra	Insect	coreid bug	2 or 4
Megalurothrips distalis	Insect	cereal thrips	2 or 4
Nipaecoccus viridis	Insect	spherical mealybug	2 or 4
Oecophylla smaragdina	Insect	red tree ant	2 or 4
Orgyia postica	Insect	cocoa tussock moth	2 or 4
Paracoccus interceptus	Insect	mealybug	2 or 4
Parasa lepida	Insect	nettle caterpillar	2 or 4
Pinnaspis strachani	Insect	Hibiscus snow scale	2 or 4
Planococcus litchi	Insect	litchi mealybug	2 or 4
Pseudococcus comstocki	Insect	Comstock mealybug	2 or 4
Pseudococcus jackbeardsleyi	Insect	Jack Beardsley mealybug	2 or 4

Pulvinaria psidii	Insect	green shield scale	2 or 4
Selenothrips rubrocinctus	Insect	cocoa thrips	2 or 4
Tessaratoma javanica	Insect	litchi stink bug	2 or 4
Tessaratoma papillosa	Insect	litchi stink bug	2 or 4
Thrips hawaiiensis	Insect	Hawaiian flower thrips	2 or 4
Tirathaba rufivena	Insect	fruit borer	2 or 4
Xyleborus fornicatus	Insect	tea shothole borer	2 or 4
Xylotrupes gideon	Insect	elephant beetle	2 or 4

Table 9: Fresh longan, *Dimocarpus longan* from Thailand regulated pest list

Scientific name	Organism type	Common name	Actions on interception
Capnodium ramosum	Fungus	sooty mould	2
Meliola euphoriae	Fungus	sooty mould	2
Phytophthora capsici	Fungus	buckeye rot	2
Phytophthora palmivora	Fungus	black rot	2
Achaea janata	Insect	castor oil looper	2 or 4
Aleurocanthus spiniferus	Insect	spiny whitefly	2 or 4
Aulacaspis tubercularis	Insect	common mango scale	2 or 4
Bactrocera correcta	Insect	guava fruit fly	3 or 4
Bactrocera dorsalis	Insect	Oriental fruit fly	3 or 4
Ceroplastes pseudoceriferus	Insect	horned wax scale	2 or 4
Ceroplastes rubens	Insect	red wax scale	2 or 4
Coccus formicarii	Insect	scale insect	2 or 4
Coccus viridis	Insect	soft green scale	2 or 4
Conogethes punctiferalis	Insect	yellow peach moth	2a or 4
Conopomorpha cramerella	Insect	cocoa pod borer	2 or 4
Conopomorpha litchiella	Insect	fruit borer	2 or 4
Conopomorpha sinensis	Insect	litchi fruit borer	2 or 4
Cornegenapsylla sinica [vector]	Insect	longan psyllid	2
Cryptophlebia ombrodelta	Insect	macadamia nut borer	2 or 4
Deudorix epijarbas	Insect	grey lychee butterfly	2 or 4
Drepanococcus chiton	Insect	wax scale	2 or 4
Eublemma brachygonia	Insect	flower caterpillar	2 or 4
Eudocima fullonia	Insect	fruit-piercing moth	2 or 4
Eudocima hypermnestra	Insect	fruit-piercing moth	2 or 4
Eudocima salaminia	Insect	fruit-piercing moth	2 or 4
Henosepilachna vigintioctopunctata	Insect	28-spot ladybird	2 or 4
Homodes bracteigutta	Insect	moth	2 or 4
Hypolycaena erylus himavantus	Insect	leaf-eating caterpillar	2 or 4
Icerya seychellarum	Insect	Seychelles scale	2 or 4
Kerria lacca	Insect	lac insect	2 or 4
Leptocorisa acuta	Insect	rice bug	2 or 4
Lohita grandis	Insect	-	2 or 4
Nipaecoccus viridis	Insect	nipa mealybug	2 or 4
Oxyodes scrobiculata	Insect	longan leaf eater	2 or 4
Planococcus citri	Insect	citrus mealybug	2 or 4
Porthesia scintillans	Insect	Hairy tussock caterpillar	2 or 4
Pseudaonidia trilobitiformis	Insect	trilobite scale	2 or 4
Pulvinaria psidii	Insect	guava scale	2 or 4
Pyrops candelaria	Insect	litchi lantern bug	2 or 4
Pyrops spinolae	Insect	bug	2 or 4
Statherotis leucaspis	Insect	leafroller	2 or 4

Tessaratoma papillosa [vector]	Insect	litchi stink bug	2
Thalassodes quadraria	Insect	caterpillar	2 or 4
Thysanofiorinia nephelii	Insect	hard scale	2 or 4
Longan witches' broom	Virus	LWBD	2

Actions on interception

2	Treat, resort, reship or destroy.
2a	Treat, reship or destroy. Suspend pathway.
3	Reship or destroy. Suspend pathway
4	Action dependent on pest interception and irradiation dosage certified as the pre-export measure.

Note: The suspension of the pathway could be at the production area, packhouse, state or country level, depending on the significance of the pest interception.

Appendix 2: Phytosanitary certificate – Additional declarations

Scientific Name: *Litchi chinensis*

Common Name: Lychee

Country: Thailand

PHYTOSANITARY CERTIFICATE - ADDITIONAL DECLARATIONS

The lychee in this consignment have:

(i) been inspected in accordance with appropriate official procedures and found to be free from regulated pests specified by the New Zealand Ministry for Primary Industries.

NOTE: Compliance with this additional declaration is not necessary for arthropods if the Thailand NPPO certifies export of this consignment under Appendix 4. The consignment may contain live (but unfertile or unable to emerge from pupation) regulated arthropod pests.

AND

(ii) been treated in accordance with Appendix 1 **or** 2 **or** 4 of the Official Assurance Programme between the New Zealand Ministry for Primary Industries and the Department of Agriculture, Thailand concerning the access of host material of fruit fly species of economic significance into New Zealand from Thailand.

AND

(iii) undergone appropriate pest control activities that are effective against *Conogethes punctiferalis*.

OTHER INFORMATION:

- Specific import health standard available at : http://www.biosecurity.govt.nz/files/ihs/litchi-th.pdf

NOTE:
Full details of the vapour heat treatment (temperature and duration) or cold disinfestations (temperature and duration) or irradiation (including dosages) must be included in the "Disinfestation and/or Disinfection Treatment" area of the phytosanitary certificate or as an endorsed attachment to the phytosanitary certificate.

Cold disinfestation completed pre-export must have treatment details such as date, temperature, and duration of the cold disinfestation included in the treatment section of the phytosanitary certificate.

For cold disinfestation completed in-transit; printouts of all temperature sensors or direct electronic downloads are to be made available to MPI at the port of arrival in New Zealand for final clearance of the container.

Scientific Name: *Dimocarpus longan*

Common Name: Longan

Country: Thailand

PHYTOSANITARY CERTIFICATE - ADDITIONAL DECLARATIONS

The longans in this consignment have:

(i) been inspected in accordance with appropriate official procedures and found to be free from regulated pests.

NOTE: Compliance with this additional declaration is not necessary for arthropods if the Thailand NPPO certifies export of this consignment under Appendix 4. The consignment may contain live (but unfertile or unable to emerge from pupation) regulated arthropod pests.

AND

(ii) been treated in accordance with Appendix 1 **or** 2 **or** 4 of the Official Assurance Programme between the New Zealand Ministry for Primary Industries and the Department of Agriculture, Thailand concerning the access of host material of fruit fly species of economic significance into New Zealand from Thailand.

AND

(iii) undergone appropriate pest control activities that are effective against *Conogethes punctiferalis*.

OTHER INFORMATION:

- Specific import health standard available at : http://www.biosecurity.govt.nz/files/ihs/longan-th.pdf

NOTE:
Full details of the vapour heat treatment (temperature and duration) or cold disinfestations (temperature and duration) or irradiation (including dosages) must be included in the "Disinfestation and/or Disinfection Treatment" area of the phytosanitary certificate or as an endorsed attachment to the phytosanitary certificate.

Cold disinfestation completed pre-export must have treatment details such as date, temperature, and duration of the cold disinfestation included in the treatment section of the phytosanitary certificate.

For cold disinfestation completed in-transit; printouts of all temperature sensors or direct electronic downloads are to be made available to MPI at the port of arrival in New Zealand for final clearance of the container.

Appendix 3: Amendment of IHS regulated pest lists

The lychee and longan regulated pest lists require amendment to remove regulated pests, based on the following criteria:

a. presence/absence in Thailand, and
b. presence/absence in New Zealand or official control activities, and
c. likely to be present on the pathway if risk was unmanaged, and
d. known to be associated with fruit, and
e. hosted by species present in New Zealand, and
f. climatically able to establish in New Zealand and/or
g. likely to cause high economic impact to New Zealand (eg. fruit fly).

Commodity	Organism scientific name	Organism common name	Amendment action
Lychee	*Aceria litchii*	Litchi gall mite	Removal
Longan	*Aceria longana*	Longan erineum mite	Removal

Assessments of these organisms are included below:

REMOVAL FROM REGULATED PEST LISTS

1. *Aceria litchii* (Acarina: Eriophyidae) was originally included in the lychee pest list; as this pest is present in Thailand and lychees are a known host (Waite & Hwang 2002). Subsequent risk analysis has confirmed that *A. litchii* has a very narrow host range with lychee being the only recorded host (MAF 2008). *A. litchi* is specific to lychee which is grown in small numbers in New Zealand that it is unlikely to provide sufficient or accessible host material for the mite to establish. Given this information, *A. litchii* has now been removed from the pest list.

2. *Aceria longana* (Acarina: Eriophyidae) was originally included in the longan pest list (incorrectly stated as *A. litchii*); this pest is present in Thailand and longans are a known host (Waite & Hwang 2002). *A. longana* is specific to longans and there are few, if any longan plants present in New Zealand; therefore, the potential for establishment of *A. longana* is considered to be negligible. Given this information, *A. longana* has now been removed from the pest list.