Ministry for Primary Industries
Manatū Ahu Matua

Risk Management Proposal:

Proposed amendment to the IHS 155.02.05: Seeds for sowing and requirements for the importation of Pisum seeds for sowing.

FOR PUBLIC CONSULTATION

13th February 2017

New Zealand Government

Growing and Protecting New Zealand

Plant Imports
Plants, Food & Environment
Ministry for Primary Industries
Pastoral House
25 The Terrace
PO Box 2526
Wellington 6140
New Zealand

Tel: +64 4 894 0100
Fax: +64 4 894 0662

Email: plantimports@mpi.govt.nz

Contents

Page

Submissions

The Ministry for Primary Industries (MPI) invites comments from interested parties on the proposed changes to the format of the Import Health Standard 155.02.05: *Seeds for Sowing*, and measures for the importation of *Pisum* seeds for sowing, supported by this Risk Management Proposal.

An IHS "specifies requirements to be met for the effective management of risks associated with importing risk goods, including risks arising because importing the goods involves or might involve an incidentally imported new organism" (section 22(1) Biosecurity Act 1993).

The following points may be of assistance in preparing comments:

- Wherever possible, comments should be specific to a particular change in IHS requirements or a question asked in this document (referencing section numbers or commodity names as applicable).
- Where possible, reasons, data and supporting published references to support comments are requested.
- The use of examples to illustrate particular points is encouraged.

MPI therefore seeks comment on the proposed changes to the format of the Import Health Standard 155.02.05: Seeds for Sowing, and requirements for the importation of *Pisum* seeds for sowing. Submitters may also like to comment separately on other aspects of the IHS and MPI will respond to these in due course.

MPI encourages respondents to forward comments electronically. Please include the following in your submission:

- The title of the consultation document in the subject line of your email;
- Your name and title (if applicable);
- Your organisation's name (if applicable); and
- Your address.

Send submissions to: plantimports@mpi.govt.nz.
However, should you wish to forward submissions in writing, please send them to the following address to arrive by close of business on 13th March 2017.

Plant Imports
Plants, Food & Environment
Ministry for Primary Industries
PO Box 2526
Wellington 6140
New Zealand

Submissions received by the closure date will be considered during the development of the final IHS. Submissions received after the closure date may be held on file for consideration when the issued IHS is next revised/ reviewed.

Official Information Act 1982

Please note that your submission is public information and it is MPI policy to publish submissions and the review of submissions on the MPI website. Submissions may also be the subject of requests for information under the Official Information Act 1982 (OIA).

The OIA specifies that information is to be made available to requesters unless there are sufficient grounds for withholding it, as set out in the OIA. Submitters may wish to indicate grounds for withholding specific information contained in their submission, such as the information is commercially sensitive or they wish personal information to be withheld.

Any decision to withhold information requested under the OIA is reviewable by the Ombudsman.

Purpose

1. The purpose of this document is to:

    - Clarify the proposed changes to the format of the Import Health Standard 155.02.05: Seeds for Sowing.
    - Summarise the known biosecurity risks of the entry of an unwanted organism (*Bruchus pisorum – pea seed weevil*) associated with the importation of *Pisum* seeds from all approved countries.
    - Summarise how the proposed measure can effectively manage risk.
    - Establish the feasibility and practicality of implementing the proposed measures.
    - Seek stakeholder feedback on the proposed phytosanitary measures

Scope

2. This RMP provides information and the process used to assess the proposed additional option to the phytosanitary measures for *Pisum* seed to manage *B. pisorum*.

3. MPI is reviewing all standards and guidance documents so that the legal requirements are clear and that information is consistently presented and easy to understand. As part of this review process MPI has reviewed and proposes to migrate all approved seed treatments to the technical standard MPI-STD-ABTRT Approved Biosecurity Treatment. Therefore, all MPI approved treatments for the seeds for sowing pathway will be centralized in one standard for clarity and ease of use. MPI is seeking feedback on the proposed changes

4. The draft amendment to the IHS is the subject of consultation under section 23(3) of the Biosecurity Act (1993). This RMP provides information to support the consultation on the IHS amendment but is not itself the subject of consultation. However, the Ministry for Primary Industries (MPI) will accept comments and suggestions on the RMP in order to improve future IHS consultations.

Part 1: Background

5. The pea weevil (*Bruchus pisorum* (Linnaeus, 1758) [Coleoptera: Bruchidae]) is a recently detected pest of pea (*Pisum*) plants in New Zealand.

6. *Bruchus pisorum* is a regulated pest in Import Health Standard 155.02.05: Seeds for Sowing and an unwanted organism. Pea weevils have been found in a number of Wairarapa commercial pea growing and storage properties. A biosecurity response has been initiated and there is a two year ban on growing green peas (including sugar snap and snow peas) in the region. New Zealand's pest free area status has been changed as a result of this detection.

7. The pest is now considered present in New Zealand and subject to official control (*as per* ISPM 8: *Determination of pest status in an area*). To support official control:

    - the pest continues to be a regulated quarantine pest for New Zealand
    - the pest is contained and being eradicated in the detection area (Wairarapa) through movement controls and a ban on host production
    - MPI has imposed mandatory phytosanitary measures for imported *Pisum* seed including a mandatory on-arrival methyl bromide fumigation directed by the Chief Technical Officer (CTO).

8. *B. pisorum* is found in many regions around the world where pea seeds are grown either for sowing or consumption. It can spread through infested seeds and heavy infestation often reduces the pea seed to shells if intervention is not taken (Ministry for Primary Industries, 2016). The pest completes its lifecycle after spending the latter part of its life in the seed. This pest has only one generation per year (monovoltine).

9. The adult weevil will emerge from its pupation stage and exit the seed in search of autumn and winter hibernation sites. Alternatively, it can remain in the seed and await sowing, emerging from the seed when soil moisture levels increase. Heat and vibration may cause the weevil to prematurely exit the seed.

10. Up to 70 percent of the weight loss of infested peas occurs in the two months after harvest because pea weevil larvae continue feeding during this period. This weight loss can be significantly reduced by fumigating the crop immediately following harvest. Fumigation also ensures seed does not contain live beetles at sowing in the next season, if these seed lots are not exposed to pea weevil after the treatment .

Commodity description

11. The following species of pea seed are eligible for import into New Zealand under the Import Health Standard 155.02.05: Seeds for Sowing:

    - *Pisum abyssinicum*
    - *Pisum elatius*
    - *Pisum fulvum*
    - *Pisum sativum*

12. *Pisum* seeds for sowing can only be imported from of the following approved countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Taiwan, United Kingdom and United States of America.

Trade

13. New Zealand produced 66,500 tonne of peas in 2015, earning approximately $27 million in domestic sales and $84.8 million in exports including $51.5 million from frozen peas (Fresh Facts, 2015). It is estimated that international demand for processed peas is growing at 12% every five years. Since pea weevil only feeds on peas, revenue earned from pea sales would be directly affected due to reduced yields. The impact of pea production in New Zealand on the GDP according to NZIER is estimated to be of $112 million dollars.

14. One of New Zealand's top export destination for peas is Australia, where exports have exceeded $32m. Further earnings of this crop were $34m from exports to countries in North America and Asia (Fresh Facts, 2015).

Current IHS requirements

15. The phytosanitary requirements listed in the IHS for pea seed weevil and approved fungicide treatment are as follow:

Testing on arrival in New Zealand

For lots of pea seed over 2kg, a small sample of pea seeds (approx. 100 grams per lot) will be taken and soaked with water on arrival to verify that the seed is free from any regulated pests (e.g. pea weevil larvae).

> **Guidance**
>
> Small samples of pea seed (< 2kg) for research purposes do not require the soak test but still require dry inspection.

Approved Treatments

The *Pisum* seeds must be treated with one of the following combinations:

a) Metalaxyl-M at 0.35g a.i per kg of seed, Fludioxonil at 0.1g a.i per kg of seed and Cymoxanil 0.2g a.i per kg of seed;

b) Fosetyl aluminium at 1.53g a.i per kg of seed, Thiram at 0.5g a.i per kg of seed and Thiabendazole at 0.37g a.i per kg of seed

Border Procedures for Pisum seeds (prior to the emergency measures)

16. Previously, where insect infested *Pisum* seed lot was detected following the pea seed test, one of the following treatments coded as SST1 of the MPI-STD-ABTRT Approved Biosecurity Treatment were applied to mitigate the risk of entry of a regulated pest:

Fumigant	Rate	Temperature	Duration
Methyl bromide	16 g/m3 24 g/m3	20 +C 10-19C	24 hrs
Phosphine	2 g/m3	10 -15C 16 – 20C 21 – 25C 26C + (max 35C)	7 days 6 days 5 days 4 days

Emergency measures

17. The current prescribed seven day phosphine treatment rate was been reviewed and may be insufficient to control pea weevil based on scientific literature. A CTO Direction under section 30A (4) of the Biosecurity Act was issued on 28 July 2016 requiring fumigation of all lots of *Pisum* seeds arriving into New Zealand for this sowing season. MPI specified that the fumigant methyl bromide (MeBr) should be used at the specifications listed in SST1 of MPI-STD-ABTRT Approved Biosecurity Treatment (http://www.mpi.govt.nz/document-vault/1555) at an MPI-approved facility until such a time as MPI reviewed the phosphine treatment. .

18. The CTO direction was put in place as a provisional measure until assessment of the most appropriate measure to apply to all *Pisum* seed lots imported into New Zealand was determined.

Part 2: Context

Domestic

19. The New Zealand biosecurity system is regulated through the Biosecurity Act 1993. Section 22 of the Act describes the meaning of an IHS, and requires that the IHS specifies requirements to be met for the effective management of risks associated with importing risk goods (including plants and plant products) into New Zealand.

20. MPI is the government authority responsible for the effective management of risks associated with the importation of risk goods into New Zealand (Part 3, Biosecurity Act 1993).

21. MPI engages with interested parties and/or affected New Zealand stakeholders when major amendments are made to an IHS.

22. MPI follows MPI guidance for decision makers and procedures for the amendment of an IHS and consultation.

International setting

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

24. 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.

Part 3: Risk Assessment

Source information

25. In the development of this RMP the following information was used to identify appropriate measures to manage the entry and establishment of *Bruchus pisorum* into New Zealand:
    - Relevant literature and database searches
    - Stakeholders feedback prior to the development of this RMP
    - MPI pest interception records

Summary of Risk

26. *Bruchus pisorum* is a regulated pest on imported pea seed because:

    - it is present in many seed exporting countries and absent from New Zealand in the South Island and under official control in the North Island, and
    - it is likely to be present on the pathway if the risk is unmitigated, or
    - it is known to be associated with the commodity, and
    - its hosts include species which are present in New Zealand, and
    - it is climatically able to establish in New Zealand, and/or
    - it is likely to cause high economic impacts to New Zealand.

Entry

27. In this Risk Management Proposal, *Bruchus pisorum* is considered to have entered New Zealand if viable larvae or adults are present in the host seeds at a low infestation level after biosecurity clearance. It is known that infestation levels below 0.1% are still capable of delivering a founder population of pea weevil, especially in larger consignments (D. Voice, pers. comm. 2017).

28. *Bruchus pisorum* is widespread in Europe, Asia, North Africa; North, Central, and South America; and southwestern Australia (Berim, 2008). Many of the *Pisum* seeds that New Zealand imports come from countries that have *Bruchus pisorum* e.g. Australia. Therefore, there is potential for this regulated pest to enter New Zealand.

29. In the last three sowing seasons MPI has intercepted nine consignments of peas containing regulated insects, including pea weevil. All these seed consignments were send for treatment (fumigation) at the importers choice. These reports provide clear evidence that *Bruchus pisorum* can be imported in commercial seed production systems, and if infested seeds are not detected at the border pests could enter New Zealand unless lots have been fumigated.

Exposure

30. The exposure assessment is made on the basis that *Bruchus pisorum* has already entered New Zealand on seeds of *Pisum* species. *Bruchus pisorum* is considered to be 'exposed' to a host plant if the infested seed with either a larvae or an adult is sown in close proximity to non-infested host plants. The adult weevil will emerge from its pupation stage and exit the seed in search of autumn and winter hibernation sites. Alternatively, it can remain in the seed and await sowing, emerging from the seed when soil moisture levels increase. Heat and vibration may cause the weevil to prematurely exit the seed. Suitable hosts of *B. pisorum* are present in New Zealand and therefore the likelihood of exposure to hosts in New Zealand is considered high.

Establishment and spread

31. The assessment of establishment of *Bruchus pisorum* via *Pisum* seeds is made on the basis that the regulated pest has been exposed to a new host plant in New Zealand. Therefore, the pest has successfully formed a population in New Zealand. The likelihood of *Bruchus pisorum* establishing in the New Zealand environment (beyond one season) is considered to be high. There is a climate match index with New Zealand of above 0.8 and 0.9 for areas of Europe and SW Australia where the pea weevil has expanded its distribution (Phillips et al. 2016).

32. The adults primarily overwinter within peas in storage, but also in the field and many other sheltered spots. The adults can use 2 strategies for survival, exit the seed after feeding and pupation is completed or the adult can stay await within the seed (D. Voice, pers. comm. 2017). Completion of the entire life cycle is dependent on the pea species (*Pisum sativum*). The pea weevil adult emerges from overwintering sites as temperatures rise and is known to fly at least 5 km attracted by flowering pea crops, feeding on flowers (pollen, nectar and sometimes petals) (Armstrong, 2005; MPI, 2016).Therefore, the likelihood of *Bruchus pisorum* spreading in New Zealand beyond the initially infected area is considered to be moderate to high if that initial area is either a commercial property or a home garden.

Economic consequences

33. The potential economic consequences are considered to be high. Pisum species are susceptible hosts of *Bruchus pisorum* and different cultivars of Pisum are grown commercially in New Zealand.Therefore there is potential for there to be economic consequences if *Bruchus pisorum* established in New Zealand.

34. An infestation caused by this insect can result in serious economic losses, in part as a result of loss of seed contents consumed by the pest but also because pea weevil-damaged seed will have lower germination rates reducing considerably the price per unit (Plantwise webpage, 2017).

35. Yield loss caused by *Bruchus pisorum* has been recorded from diverse geographic regions, in Australia 11-72% (Horne and Bailey, 1991); in Spain 12-26% (Marzo *et al.* 1997) and in USA up to 64% (Pesho et al., 1977).

36. Direct impact of pea weevil establishing in New Zealand (particularly the South Island) would be reduction of yield by consumption of the seed by the insect or by increasing the number of seeds split during threshing. Yield loss has been recorded to be as much as 15% during heavy infestations. During harvest, when the seeds have 13% seed moisture content, the pea weevil larvae are normally found to be immature and have by then only completed 20 to 30% of their feeding. Therefore, at least 70 to 80% of the seed damage has yet to be done (Armstrong, 2005).

37. Economic impacts will likely continue in subsequent years if the same *Pisum* crop is planted in the same field, because the new crop will likely become infested with the regulated pest via transmission from the infested seed in the field and/or adults from overwintered sites. The growing costs would increase because of the additional application of insecticides to manage the insects in the field and in some cases fumigation of seed post-harvest. Maximum Residue Limit (MRL) levels may also be an issue for some importing countries especially for marrowfat peas and the Asian market (D. Voice, 2017 pers. comm.)

38. Fumigation at this time, straight after harvest, prevents further seed weight (yield) loss. There is nil tolerance in the human consumption pea market for live or dead pea weevil. The same level of tolerance is also present in the stock feed and seeds for sowing market. The damage caused by the insect in the seeds (circular cavities) are not visually acceptable for human consumption, while it also directly affect seed sprouting percentages (Armstrong, 2005).

Part 4: Risk Management

Pea soak test

39. The requirement for pea soak test has been removed from the Import Health Standard 155.02.05: Seeds for Sowing and replaced with a mandatory fumigation under the CTO Direction under section 30A (4) of the Biosecurity Act issued on the 28th July 2016.

40. It is known that infestation levels within a pea seed lot is not expected to be uniform in its distribution and that infestation levels lower than 0.1% are still capable to deliver a founder population of *Bruchus pisorum*, especially in larger consignments (D. Voice, pers. comm. 2017)

41. Pea soak test on arrival, performed at a higher rate of 3152 seeds (approx. 700g) based on the Poisson distribution, *as per* ISPM 31: *Methodologies for Sampling of Consignments* does provide 95% confidence of detecting pea weevil at levels of 0.1% infestation.

42. This information does not support the re instatement of the pea soak test for Pisum seeds, even at higher sampling rates; as the only phytosanitary measure for *Bruchus pisorum* in the Import Health Standard 155.02.05: Seeds for Sowing. The pea soak test does not provide a sufficient level of confidence that a consignment is free of *B. pisorum.*

Treatment and efficacy

43. Fumigation is one of the most effective methods to control storage insects, but it is effective only when seeds are fumigated at an efficacious dose and time for the temperature and moisture content.

44. This control strategy (fumigation) plays a major role in insect pest elimination in stored products. Fumigants have the ability to penetrate the insect body through the spiracles advancing via the trachea and tracheoles. The toxic gas completely fills an area with the purpose to suffocate or poison the pests within (Shadia, 2011).

45. After examining scientific literature it was determined that the current prescribed seven day phosphine treatment rate may be insufficient to control pea weevil. Phosphine treatment of imported infested seed was suspended in July 2016.

46. To maintain its area freedom Tasmania and parts of New South Wales requires that all Pisum seeds imported into the area are phosphine fumigated prior to delivery. The fumigation period is of 10 days.

47. At present fumigation is managed by a Chief Technical Officer Direction to MPI inspectors for on-arrival treatment of Pisum consignments and it is now proposed that an effective offshore fumigation measure is included in the Pisum schedule of the seed for sowing standard.

48. The important fumigants used to manage pests associated with seed are:

- methyl bromide
- aluminium phosphide
- ethyl formate
- hydrogen cyanide

49. Methyl bromide treatment is currently mandatory for imported *Pisum* seed. However, aluminium phosphide (also known as phosphine) is considered one of the best fumigants for seeds as deleterious effect on seed quality has not been reported although it requires a longer fumigation time.

Phosphine

50. It is proposed to reinstate phosphine as an alternative fumigant option in the technical standard MPI-STD-ABTRT Approved Biosecurity Treatment (http://www.mpi.govt.nz/document-vault/1555). Fumigation with either Methyl Bromide or phosphine is proposed as a mandatory requirement for all Pisum seeds imported into New Zealand. Phosphine has a broad spectrum activity against many invertebrates and has been registered for disinfestation of stored products and post-harvest application for many years (EPPO, 2012). The proposed rate and exposure rate for the treatment are as follow:

Phosphine	2 g/m^3	10 -15ºC	14 days
		16 – 20ºC	13 days
		21 – 25ºC	12 days
		26ºC + (max 35C)	11 days

- The proposed phosphine schedule provides an appropriate level of protection to manage all life stages of *B. pisorum* from countries where the pest could infest *Pisum* seed for sowing. The efficacy of the phosphine fumigation at 2g/m^3 is dependent on insect life stage, treatment duration and temperature.

  Life stages

i. Some life stages of insects are more tolerant to phosphine that others. Eggs and pupae are normally more tolerant to the gas and adults succumb more easily (FAO 1989). Reynolds *et al* 1967 described that this tolerance could at least be partially overcome by the development of the different life stages that occurred in the insects during the relatively long exposure periods to the fumigant.

The author described, based on an experiment with another common grain storage pest, *Sitophilus granaries* (grain weevil), that all pre-adult stages, some of which are quite tolerant to the fumigant, may reach a susceptible stage of development during long periods of exposure to phosphine (e.g.10-day duration), leading to complete mortality of the insect (Reynolds *et al.*1967).

Treatment duration and Temperature

ii. The duration or exposure time is an important factor for efficacy of phosphine against pea weevil.

iii. A dose of 2g/m^3 for 7 days at 10-15 ºC (the current approved rate in MPI- STD-ABTRT Approved Biosecurity Treatments) is considered insufficient to kill pea weevil (Waterford & Winks 1994). Waterford & Winks (1994) tested two field strains of *B. pisorum* and exposed to phosphine fumigation at two constant concentrations of 120µg/L and 240 µg/L and one decaying concentration at 1.5 g/m^3 at 25ºC and 15ºC for periods of 5,10, 14 and 21 days. The best results were achieved when using 1.5 g/m^3 concentration at both temperatures 25 ºC and 15 ºC. No weevils at the larvae, pupae and adult stages were found alive in samples taken from the treatments at 14 and 21 days of exposure to phosphine fumigation (Waterford & Winks 1994). It is expected that most pea weevil arriving in imported seed to be at the pupal or adult stage unless the seed is exported straight after harvesting (Dave Voice, pers. comms. 2017).

iv. The EPPO standard PM 10/21 (1) states that the duration of the fumigation with phosphine must be performed long enough to allow for an almost complete reaction between the phosphine products with moisture present in the commodity so that little or no non-reacted phosphine products remain. The longer the fumigation time when using phosphine is, the more effective the fumigation. (EPPO, 2012).

v. The work of Williams and Whittle (1994) support the results of Waterford & Winks (1994). The authors stated that pea weevil in stored peas can be controlled using a single dose of phosphine applied at the rate of 1.5 g/m3 at a minimum exposure time of 21 days at storage temperature between 20-30 ºC (Williams and Whittle, 1994).

vi. Relative temperature, humidity, commodity moisture levels and gas-tightness of the building/container will influence the effectiveness of the treatment (EPPO, 2012).

vii. The toxicity of the fumigant will decrease if the temperature of the container falls below 10 ºC (FAO, 1989).

Packaging

viii. The permeability of packaging films presents a significant barrier to effective fumigation of imported goods with fumigants with PVC and HDPE presenting a greater barrier to effective fumigation than LDPE. Multilayer packing in different packaging materials (e.g. a cardboard box with a LDPE internal liner and shrink-wrapped with PVC) of some imported products compounds the problem of effective gas distribution (Bycroft et al 2008).

ix. Fumigation of Pisum seed packed within sealed impermeable packages or with plastic liners (such as the one tonne bags), plastic wrappings such as cellophane, films, shrink wrap, and papers that are waxed, laminated, or waterproofed are not readily permeable by methyl bromide and other fumigants and must therefore be perforated, removed, or opened (slashed) before fumigation.

Part 5: Feasibility & Practicality of Measures

51. The New Zealand pea seed industries would benefit from the measures implemented to mitigate the risk of importing infested pea seeds into New Zealand.

52. The mandatory application of either a phosphine or methyl bromide fumigation treatment as proposed in point 54 is operationally feasible and effectively manages the risk posed by *B. pisorum* for the following reasons:

- *The treatments are efficacious.*

i. Methyl bromide and phosphine are two of the most common chemical fumigants for stored-product protection worldwide.

ii. Methyl bromide is an effective, broad spectrum and versatile fumigant. It can penetrate quickly and deeply into sorptive materials at normal atmospheric pressure, while dissipate rapidly and make possible the safe handling of bulk commodities (FAO, 1989). Regardless, as a signatory to the Montreal Protocol, New Zealand is urged to phase out using methyl bromide where possible due to its negative effects on the ozone layer even though quarantine use is exempt under the Protocol.

iii. Phosphine leaves minimal residues, and is acceptable to most markets, while being effective against insects in most types of grain. Phosphine has a broad spectrum activity against many invertebrates and has been registered for disinfestation of stored products and post-harvest application for many years (FAO, 1989). Evidence from Waterford & Winks (1994), Williams and Whittle (1994) and EPPO, 2012 supports a longer exposure time for the application of phosphine as a fumigant to control *Bruchus pisorum*.

- *The treatment can be applied with existing methodology*

  i. No change is proposed to the dosage (g/m^3) and temperature for both fumigants, only to the exposure time for phosphine. Phosphine is a slow acting fumigant when in comparison with methyl bromide, not responding readily to the increase in concentration, but exposure time. It is expected that current MPI approved treatment facilities will be able to carry out the proposed treatments without further issues.

  ii. Phosphine and methyl bromide have been tested successfully on a range of commodities including seeds as a post-harvest treatment.

  iii. Maintaining adequate gas tightness, to minimize losses, during the fumigation period is important.

- *The treatment maintains seed quality.*

  i. There is considerable evidence that phosphine in insecticidal treatments does not, under normal conditions, affect the germination of seeds (FAO, 1989).

  ii. Sorption studies of phosphine by Williams & Whittle (1994) showed that field peas do not sorb excessive amounts of phosphine, and the desorption experiments demonstrated that the sorbed phosphine is readily desorbed leaving no detectable phosphine residue in the peas.

Part 6: Proposed amendments to the current IHS: Seeds for sowing

Measures for *Bruchus pisorum*

53. The proposed requirements for *Bruchus pisorum* in the Pisum schedule are :

- All lots of pea seed imported into New Zealand are required to be fumigated according to the specifications listed in MPI-STD-ABTRT Approved Biosecurity Treatment (http://www.mpi.govt.nz/document-vault/1555)
- The fumigation treatment is required to be completed offshore prior to export, or on arrival in New Zealand.
- Pre-export fumigation for each seed lot must be endorsed by the NPPO on the phytosanitary certificate, where the fumigant used, dosage, temperature and time must be clearly stated, or if done on arrival in New Zealand, must be completed in an MPI-approved facility.

54. The proposed mandatory fumigation options for *Bruchus pisorum* listed in MPI-STD-ABTRT Approved Biosecurity Treatment (http://www.mpi.govt.nz/document-vault/1555) are:

Fumigant	Rate	Temperature	Duration
Methyl bromide	16 g/m^3 24 g/m^3	20 +ºC 10-19ºC	24 hrs
Phosphine	2 g/m^3	10 -15ºC 16 – 20ºC 21 – 25ºC 26ºC + (max 35C)	14 days 13 days 12 days 11 days

55. The revised schedule for Pisum seeds can be found in APPENDIX 1.

56. MPI welcomes comments on the proposed measures.

Format changes

57. The IHS has been revised and all approved treatments listed will migrate into the technical standard MPI-STD-ABTRT Approved Biosecurity Treatment [http://www.mpi.govt.nz/document-vault/1555] to improve layout, to centralize all approved treatments for seeds for sowing in one standard, to clarify the overall approved treatments, and to facilitate reviews and updates.

58. Stakeholders and NPPOs will be required to refer to the treatment standard to obtain information on the approved treatments required for imported seed, prior to phytosanitary certification.

59. The removal of the approved treatments from the Import Health Standard 155.02.05: Seeds for Sowing to the technical standard MPI-STD-ABTRT Approved Biosecurity Treatment [http://www.mpi.govt.nz/document-vault/1555] will facilitate periodic reviews of fungicides and other treatments to ensure the best practice options are used to manage pests. Listing the treatments in MPI-STD-ABTRT allows the treatments to be updated more quickly than through the IHS process.

60. The technical standard MPI-STD-ABTRT can be updated following targeted consultation with the industry and a decision document signed by the Chief Technical Officer. Since the last IHS review of chemicals, a number of new, more efficacious formulations have been released into the market, while others have been removed from the market, although they are still listed in the IHS.

61. MPI welcomes comments on the proposed changes.

References

1. Armstrong, E. (2005). Managing Pea Weevil. Retrieved January 19, 2017, from http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0020/157034/pulse-point-04.pdf

2. Berim, M. N. (All Russian Institute of Plant Protection, St. Peterburg-Pushkin, Russia). 2008. Bruchus pisorum. In A. N. Afonin, S. L. Greene, N. I. Dzyubenko, A. N. Frolov (eds.). 2008. Interactive Agricultural Ecological Atlas of Russia and Neighboring Countries. Economic Plants and their Diseases, Pests and Weeds [Online]. Available at : http://www.agroatlas.ru/en/content/pests/Bruchus_pisorum/

3. Biosecurity Act 1993. http://www.legislation.govt.nz/act/public/1993/0095/latest/whole.html#DLM314623

4. Bycroft et al. Methyl bromide penetration of plastics. MAF Operational Research 2008.

5. FAO 1984. Manual of fumigation for insect control. EJ Bond, FAO Plant Production and Protection Paper 54.

6. Fresh Facts. (2015, June 30). Retrieved January 19, 2017, from http://www.freshfacts.co.nz/files/freshfacts-2015.pdf

7. European and Mediterranean Plant Protection Organization (EPPO) (2012), Phosphine fumigation of stored products to control stored product insects in general. EPPO Bull, 42: 498–500. doi:10.1111/epp.2622

8. Gamiel et al. Permeability of Plastic Films to Methyl Bromide: A Comparative Laboratory Study. Pestic. Sci. 1998, 53, 141-148.

9. Marzo, F., Aguirre, A., Castiella, M. V. and Alonso, R. 1997. Fertilization effects of phosphorus and sulfur on chemical composition of seeds of Pisum sativum L. and relative infestation by Bruchus pisorum. L. J. Agric. Food. Chem. 45, 1829—1833.
10. Ministry for Primary Industries. 2016. Look out for Pea Weevil, viewed 19 January 2017, http://www.hortnz.co.nz/assets/Uploads/Pea-weevil-fact-sheet-20.5.2016.pdf

11. MPI 2017. Approved Biosecurity Treatments, MPI-STD-ABTRT https://mpi.govt.nz/document-vault/1555

12. MPI 155.02.05 Import Health Standard (IHS): *Seeds for sowing* http://www.mpi.govt.nz/document-vault/1151

13. Official Information Act 1982. http://www.legislation.govt.nz/default.aspx

14. Pea weevil (Bruchus pisorum). (n.d.). Retrieved January 18, 2017, from http://www.plantwise.org/KnowledgeBank/Datasheet.aspx?dsid=9907

15. Pesho, G. R., Muehlbauer, F. J. and Harberts, W. H. 1977. Resistance of pea introductions to the pea weevil. J. Econ. Entomol. 70, 30—33.

16. Phillips, C. B.; Kean, J. K.; Vink, C. J. (In prep) A climate match analysis between New Zealand and the rest of the world. http://www.arcgis.com/home/webmap/viewer.html?webmap=e7e1c77123dc4b8fb336c1a825207f1f

17. Reynolds, E.M., Robinson, J.M. & Howells, C. The effect on Sitophilus 1967 granarius (L.) of exposure to low concentrations of phopshine. J. Stored Prod. Res., 2 : 177 - 186.

18. Shadia E. Abd El-Aziz, 2011. Control Strategies of Stored Product Pests. Journal of Entomology, 8: 101-122.

19. Waterford, C. J. and Winks, R. G. (1994) Response of the pea weevil Bruchus pisorum (L.) to phosphine. In Highley, E.; Wright, E.J.; Banks, H.J.; Champ, B.R. (Eds.), Stored Product Protection, Proceedings of the 6th International Working Conference on Stored-Product Protection, 17-23 April 1994, Canberra, Australia. CAB International, Wallingford, United Kingdom. (ISBN 0851989322)

20. Williams, P. and Whittle, C. P. (1994) Phosphine fumigation of stored field peas for insect control. In Highley, E.; Wright, E.J.; Banks, H.J.; Champ, B.R. (Eds.), Stored Product Protection, Proceedings of the 6th

International Working Conference on Stored-Product Protection, 17-23 April 1994, Canberra, Australia. CAB International, Wallingford, United Kingdom. (ISBN 0851989322)

21. WTO 1995. *Agreement on Sanitary and Phytosanitary Measures*. Geneva: World Trade Organisation.

APPENDIX 1- Proposed schedule for Pisum seeds for sowing

2.60 Pisum

The following proposed requirements only apply to species in the Plant Biosecurity Index listed under Import Specifications for Seed - see 155.02.05 under *Pisum*.

Countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Taiwan, United Kingdom and United States of America.

Quarantine pests: Refer to "Pest List for *Pisum*".

Import permit: Not Required

2.60.1 Phytosanitary certificate - Additional declarations
(1) In addition to the certifying statement in Part 1.5.2 of this import health standard, if satisfied that the pre-shipment activities have been undertaken, the exporting country NPPO must confirm this by recording the treatments applied in the disinfestation and/or disinfection treatment section, and by providing the following additional declarations to the phytosanitary certificate:

a) "The *Pisum* seeds have been:
i) sourced from a 'pest free area' free from *Broad bean mottle virus, Broad bean stain virus, Clover yellow mosaic virus, Pea early-browning virus, Pea enation mosaic virus, Peanut mottle virus, Peanut stunt virus*.

OR
ii) sourced from a 'pest free place of production' free from *Broad bean mottle virus, Broad bean stain virus, Clover yellow mosaic virus, Pea early-browning virus, Pea enation mosaic virus, Peanut mottle virus, Peanut stunt virus*";

AND
b) "The *Pisum* seeds have been:
i) sourced from a 'pest free area' free from *Cladosporium cladosporioides* f. sp. *pisicola";*

OR
ii) "treated with one of the fungicide combinations in MPI approved treatments (refer to MPI-STD-ABTRT Approved Biosecurity Treatment)".

2.60.2 Fumigation

(1) All lots of pea seed imported into New Zealand are required to be fumigated according to the specifications listed in MPI-STD-ABTRT Approved Biosecurity Treatment (http://www.mpi.govt.nz/document-vault/1555)

(2) The fumigation treatment is required to be completed offshore prior to export, or on arrival in New Zealand.

(3) Pre-export treatment for each seed lot must be endorsed by the NPPO on the phytosanitary certificate, where the fumigant used, dosage, temperature and time must be clearly stated, or if done on arrival in New Zealand, must be completed by an MPI-approved facility.

2.60.3 Approved Fungicide Treatments

(1) All lots of pea seed imported into New Zealand are required to be treated according to the specifications listed in MPI-STD-ABTRT Approved Biosecurity Treatment (http://www.mpi.govt.nz/document-vault/1555)

(2) The treatment is required to be completed offshore prior to export, or on arrival in New Zealand.

(3) Pre-export treatment for each seed lot must be endorsed by the NPPO on the phytosanitary certificate, where the fungicide used and application rate must be clearly stated, or if done on arrival in New Zealand, must be completed by an MPI-approved facility.