Risk Management Proposal:

Rubus spp. Seed for sowing from all countries

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Plant & Plant Product Imports
Import & Export Standards Directorate
Ministry of Agriculture & Forestry
Pastoral House
25 The Terrace
PO Box 2526
Wellington 6011
New Zealand

Tel: +64 4 894 5541
Fax: +64 4 894 0662
Email: plantimports@maf.govt.nz
**Purpose**
The purpose of this document is to:
- summarise the biosecurity risks associated with *Rubus* spp. seed for sowing stock from all countries;
- recommend measures for the effective management of these risks; and,
- seek stakeholder feedback on the proposed management options and import requirements as outlined in the draft import health standard schedule.

This import health standard (IHS) schedule has been developed in accordance with Section 22 of the Biosecurity Act (1993).

**Background**
A 2009 review of the import requirements for *Rubus* spp. nursery stock and the development of the MAF Post Entry Quarantine Testing Manual have identified a number of gaps in the current *Rubus idaeus* seed for sowing import health standard schedule.

The scope of the IHS has been extended to include all species of *Rubus* approved for import into New Zealand; to update the *Rubus* testing schedule and to include specific measures to manage the risks.

**Objective**
The objective is to effectively manage biosecurity risks posed by the importation of *Rubus* spp. seed for sowing, in a way that is consistent with New Zealand’s domestic legislation and international obligations.

**Analysis**
This analysis draws on the significant body of information that already exists for *Rubus* spp., which includes:
- the seed for sowing IHS schedule for *Rubus idaeus*, under the IHS 155.02.05: Importation of Seed for Sowing
- the nursery stock IHS schedule for *Rubus* (under the IHS 155.02.06: Importation of Nursery Stock);
- the MAF Post-Entry Quarantine Testing Manual for *Rubus* (Raspberries, Blackberries and Hybridberries)

1. **COMMODITY DESCRIPTION**
The IHS will cover all the approved species of *Rubus* seed for sowing as listed on the MAF Plants Biosecurity Index imported into New Zealand for the purpose of propagation.

Under the current and proposed updated IHS, *Rubus* seeds are not eligible for biosecurity clearance on arrival in New Zealand. Seeds are imported into MAF-approved post entry quarantine facility, where they are germinated and the resulting daughter plants are grown. Only daughter plants are eligible for biosecurity clearance.

2. **REGULATED ORGANISMS REQUIRING MANAGEMENT**
The regulated organisms associated with *Rubus* seed for sowing are considered to be a subset of those identified in association with *Rubus* spp. nursery stock. Organisms that are seed
transmitted were identified during the development of the Post Entry Quarantine Testing Manual for Rubus.

2.1 Viruses

The current seed for sowing IHS identifies Tomato black ring virus and Tomato ringspot virus as regulated. MAF considers that Raspberry ringspot virus is also a risk associated with imported Rubus spp. seed for sowing.

2.1.1 Raspberry ringspot virus

*Raspberry ringspot virus* (RpRSV) can be vectored by soil nematodes in the genus *Longidorus* (one species of which – *Longidorus elongatus* is present in New Zealand). This virus can also be transmitted through infected seed (Lister and Murant, 1967). The host range for RpRSV is much wider than Rubus, and includes other economically important crops, e.g. *Fragaria, Prunus, Vitis, and Ribes* (DPV, access date Feb 2011).

RpRSV has a host range wider than *Rubus*, and is included in the seed for sowing schedules for *Fragaria* and *Ribes*, and also in the nursery stock schedules for *Fragaria, Prunus, and Vitis*.

2.1.2 Tomato black ring virus

*Tomato black ring virus* (TBRV) has two known soil nematode vectors – *Longidorus attentuatus* and *Longidorus elongatus* (the latter of which is present in New Zealand), as well as being spread through infected seed (Lister and Murant, 1967). The host range for TBRV is much wider than Rubus and includes other economically important crops, e.g. *Prunus, Allium, Fragaria, Ribes, Vitis, and Phaseolus* (DPV, access date Feb 2011).

TBRV has a host range wider than *Rubus* seed, and is included in the seed for sowing schedules for *Fragaria and Phaseolus*, and also in the nursery stock schedules for *Fragaria, Allium, Prunus, and Tulipa*.

2.1.3 Tomato ringspot virus

*Tomato ringspot virus* (ToRSV) can be vectored by nematodes in the genus *Xiphinema* (six species are present in New Zealand), as well as transmitted through infected seed (Lister and Murant, 1967). The host range for ToRSV is wider than Rubus, and includes other economically important crops, e.g. *Fragaria, Prunus, Malus, Vaccinium*, and *Solanum lycopersicum* (DPV, access date Feb 2011).

Some strains of ToRSV are present in New Zealand. However, the strain infecting Rubus has not been detected in New Zealand. ToRSV has a host range wider than Rubus, and is included in the seed for sowing schedules for *Fragaria and Vaccinium*, and also in the nursery stock schedules for *Fragaria, Lilium, Prunus, Rubus, Tulipa*, and *Vaccinium*.

The proposed specific management steps for these regulated organisms and diseases are discussed in section 4.

3. MANAGEMENT OF RISK

All seed for sowing imported into New Zealand must undergo a number of steps to ensure that the risk of regulated organisms is reduced to an acceptable level. Table 1 provides a summary of the mitigation and verification steps that Rubus spp. seed for sowing must go through to ensure freedom from regulated pests and disease.

All *Rubus* seed for sowing imported into New Zealand must be imported under a permit to import, issued by MAF under the import health standard 155.02.05: Importation of Seed for Sowing. The permit to import is used to facilitate the import of the material, and details the specific import requirements for the particular consignment.
Table 1. Summary of mitigation and verification steps for Rubus seed for sowing

<table>
<thead>
<tr>
<th>Step</th>
<th>Target organisms</th>
<th>Description of measures</th>
<th>Related documents</th>
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| Pre-export phytosanitary    | All              | Prior to issuing a phytosanitary certificate, the exporting National Plant Protection Organisation (NPPO) must inspect the seed in accordance with appropriate official procedures for freedom from visually detectable regulated pests, and to ensure the consignment conforms to New Zealand’s import requirements. | 155.02.05: Importation of Seed for Sowing  
| inspection                  |                  |                                                                                                                                                                                                                  |                                                                                                       |
| On arrival verification/    | All              | A 5kg sample (or the whole consignment if less than 5kg) is inspected to verify compliance with the import requirements, and to achieve a 95% confidence level for freedom from visually detectable regulated pests. | 155.02.05: Importation of Seed for Sowing  
MAF Border Clearance Procedures (internal MAF document)                                                |
| inspection                  |                  |                                                                                                                                                                                                                  |                                                                                                       |
| Post entry quarantine       | All              | The seed must be germinated, and the resulting daughter plants actively growing in a level two PEQ greenhouse for a minimum growing period of three months.  
The minimum three month PEQ period is required for the completion of all serological, molecular and herbaceous indicator testing, which must be carried out on plants which are in active growth.  
Plants undergo growing season inspection for visual symptoms of disease expression, and testing for pests and diseases of significant biosecurity concern. | MAF operational standard PBC NZ.TRA.PQCON: Specification for the Registration of a Plant Quarantine or Containment Facility, and Operator  
155.02.05: Importation of Seed for Sowing  
MAF Operational Standard 155.04.03: Diagnostic Facilities which undertake the identification or new organisms, excluding animal pathogens  
MAF Post-Entry Quarantine Testing Manual for Rubus (Raspberries, Blackberries and Hybridberries)  
Border Clearance Procedures                                                                                      |
| (PEQ)                       |                  |                                                                                                                                                                                                                  |                                                                                                       |

3.1 Pre-export phytosanitary inspection and certification

The exporting National Plant Protection Organisation (NPPO) inspects the consignment to confirm that it meets New Zealand’s import requirements. The exporting NPPO must verify the following pre-export activities have been completed:

- The seed for sowing is inspected in accordance with appropriate official procedures and is found to be free from visually detectable regulated pests and diseases

Where the exporting NPPO has verified that the consignment is compliant with the import requirements and no visually detectable regulated pests and disease have been identified, a phytosanitary certificate is issued. Following certification, the seed must be held in a manner to prevent infestation/reinfestation with regulated pests and diseases.

3.2 On arrival verification of pre-export measures

On arrival in New Zealand, the MAF inspector will inspect the consignment to verify the required pre-export measures have been met. This verification includes the following steps:

- Inspection of the phytosanitary certificate and permit to import to ensure compliance with the import requirements
• Inspection of a 5kg sample (or the whole sample if under 5kg) to achieve a 95% confidence level for freedom from visually detectable regulated pests.

Where the MAF inspector has verified that the consignment is compliant, the inspector will authorise movement of the seed to post entry quarantine.

3.3 Post entry quarantine

All *Rubus* seed for sowing imported enters a post entry quarantine (PEQ) facility on arrival in New Zealand and are germinated. The resulting daughter plants undergo a period of post entry quarantine to ensure freedom from regulated pests and diseases.

It is proposed that the material shall enter a Level 2 post entry quarantine facility. A minimum growing period of three months is proposed as the time required allowing the imported material to undergo serological, molecular, and herbaceous indicator testing.

The three month growing period will begin once the germinated seeds have two fully expanded leaves.

3.3.1 Growing season inspection

Material must undergo regular growing season inspections by a MAF Biosecurity Inspector, to ensure freedom from visually detectable regulated pests. Where visible signs of pests and disease are detected, samples may be collected and sent for diagnostic testing.

The operator of the post entry quarantine facility is also expected to undertake regular inspections of the plants during the growing season, and to notify the MAF Biosecurity Inspector if pest or disease symptoms are observed.

3.3.2 Testing for regulated organisms of significant biosecurity concern

Pests and diseases of significant concern require specific mitigation measures to ensure they do not enter and establish in New Zealand.

The following specific tests may be appropriate to detect regulated viruses:

- Biological tests: herbaceous indexing
- Molecular tests: polymerase chain reaction (PCR)
- Serological tests: enzyme linked immunosorbent assay (ELISA)

For viruses the proposed testing requirements are based on the level of biosecurity risk associated with the organism. Due to the potential biosecurity risk posed by some organisms, a combination of testing methods is proposed.

With prior approval from MAF, internationally accepted testing methods will be accepted as equivalent to the requirements of the import health standard.

The Post Entry Quarantine Testing Manual for *Rubus* describes appropriate testing protocols for each of the proposed tests.

3.4 Non-compliance

Imported seed or daughter plants in PEQ (derived from imported seed) which are not compliant with the import requirements will not be eligible for biosecurity clearance. Where the inspector identifies that the seed consignment is not compliant, the importer will be given
the option to make the consignment compliant (where appropriate) or to reship or destroy the material.

3.5 Equivalence
If the seed will not meet the conditions of the import health standard, the importer may submit to MAF an application for assessment of equivalent phytosanitary status. Where MAF determines that alternative measures will provide an equivalent phytosanitary status, the details of the equivalence will be recorded on the permit to import.

3.6 Biosecurity clearance
Biosecurity clearance shall only be given for daughter plants in PEQ, where the inspector is satisfied that the following has occurred:
- The imported seed and daughter plants in PEQ comply with the requirements of the import health standard
- There are no discrepancies in accompanying documentation
- The goods display no signs of harbouring organisms that may be unwanted organisms
- There has been no recent change in circumstances or knowledge that makes it unwise to give biosecurity clearance.

4. MAF PROPOSAL
This section outlines the proposed requirements for each regulated organism associated with Rubus spp. seed for sowing.

4.1 Viruses

4.1.1 Raspberry ringspot virus
As Raspberry ringspot virus (RpRSV) can be dispersed naturally, and the introduction of this virus would have impacts outside the berry industry, MAF considers that specific testing for this virus is required. MAF considers that herbaceous indexing on to the indicator species Chenopodium quinoa, Cucumis sativus, Nicotiana clevelandii and the optional species Chenopodium amaranticolor, in conjunction with a serological or molecular test, is appropriate to detect RpRSV (IHS 152.05.06: Importation of Nursery Stock and MAF Rubus Testing Manual).

Proposal
That Raspberry ringspot virus is included as a regulated pest, and that one of the following measures must be met prior to biosecurity clearance being given:
- Pest free area declaration (assessed by MAF)
- Herbaceous indexing (Chenopodium quinoa, Cucumis sativa, and Nicotiana clevelandii) AND ELISA or PCR

4.1.2 Tomato black ring virus
As Tomato black ring virus (TBRV) can be dispersed naturally, and the introduction of this virus would have impacts outside the berry industry, MAF considers that specific testing for this virus is required. MAF considers that herbaceous indexing on to the indicator species Chenopodium quinoa, Cucumis sativa, Nicotiana clevelandii, and the optional species Chenopodium amaranticolor, and in conjunction with a serological or molecular test, is appropriate to detect TBRV (IHS 152.05.06: Importation of Nursery Stock and MAF Rubus Testing Manual).

Proposal
That Tomato black ring virus is included as a regulated pest, and that one of the following measures must be met prior to biosecurity clearance being given:
- Pest free area declaration (assessed by MAF)
- Herbaceous indexing (Chenopodium quinoa, Cucumis sativa, and Nicotiana clevelandii) AND PCR
4.1.3 *Tomato ringspot virus*

As *Tomato Ringspot virus* (ToRSV) can be dispersed naturally, and the introduction of this virus would have impacts outside the berry industry, MAF considers that specific testing for this virus is required. MAF considers that herbaceous indexing on to the indicator species *Chenopodium quinoa*, *Cucumis sativa*, *Nicotiana clevelandii*, and the optional species *Chenopodium amaranticolor*, in conjunction with a serological or molecular test, is appropriate to detect ToRSV (IHS 152.05.06: Importation of Nursery Stock and MAF *Rubus* Testing Manual).

**Proposal**

That *Tomato ringspot virus* is included as a regulated pest, and that one of the following measures must be met prior to biosecurity clearance being given:
- Pest free area declaration (assessed by MAF)
- **Herbaceous indexing** (*Chenopodium quinoa*, *Cucumis sativa*, and *Nicotiana clevelandii*) AND ELISA or PCR

4.2 **Post Entry Quarantine**

The IHS currently requires seed to be imported into a level three PEQ facility, germinated and grown for a minimum period of one growing season, and for the plants to undergo testing for regulated viruses. The level of PEQ required has been reviewed, and MAF considers that a level two PEQ facility is adequate for holding *Rubus* plants derived from imported seed. *Tomato black ring virus*, *Tomato ringspot virus*, and *Raspberry ringspot virus* are all transmitted by nematodes. A level two PEQ facility requires that plants are grown in pots on raised benches, MAF regards a level two PEQ facility as sufficient to contain these regulated viruses.

A minimum PEQ period of three months is proposed, as the time required for the plants to grow sufficient leaf material for testing and treatment to occur. The three month PEQ period will commence once plants have entered a period of active growth and have two fully expanded leaves. Testing for regulated viruses can occur when there is sufficient leaf material to be collected in accordance with section 7 of the MAF *Rubus* Testing Manual. Inspection of herbaceous indicator plants takes a minimum of fours weeks, which may impact on the timeframes for biosecurity clearance.

**Proposal**

That the PEQ requirements for *Rubus* spp. be amended, to allow seed to be grown in a Level 2 PEQ greenhouse for a minimum growing period of three months, to undergo growing season inspections and testing for regulated viruses.

**REFERENCES**


MAF Biosecurity New Zealand standard 155.02.05 Importation of Seed for sowing