Pelleted ornamental flower & greenhouse seeds – extended briefing paper

10 April 2019

1. Summary

1.1. New Zealand Plant Producers Incorporated (NZPPI) requests the immediate removal of the border measures for pelleted ornamental flower and greenhouse seeds (group 3)[1] by amendment to the Chief Technical Officer (CTO) Direction.

1.2. It is entirely reasonable for these pathways to be regulated differently to other pelleted seed pathways, commensurate with risk. Group 3 seeds present a negligible risk for the introduction and establishment of new pests and diseases and this is confirmed by the results from 19 months of border seed testing.

1.3. The commercial ornamental flower and greenhouse seed pathways are an integrated system, with production controls used both pre- and post-border. These controls, along with the results from testing, provide MPI with assurance that risk is appropriately managed in the pathway.

1.4. The border measures have had a disproportionately greater impact to the plant production sectors compared to other sectors (agricultural, arable and seed production). This is due to the large numbers of different varieties and species imported (Appendix 1) and the much smaller batch sizes. Testing costs have so far exceeded $200,000 while an estimated 8 million high-value pelleted seeds have been destroyed.

1.5. Continued testing while the Ministry for Primary Industries (MPI) drafts and consults on permanent measures to include in the import health standard (IHS) is not justified based on risk.

2. Background

2.1. The import health standard (IHS) does not currently specify requirements for pelleted seed. MPI introduced border measures for pelleted seeds under urgency in June 2016, in response to the incursion of regulated weed seeds in pelleted fodder beet.

[1] Group numbers were updated during a subsequent amendment to the CTO Direction on 14 September 2017. This document continues to refer to the original group numbers to avoid confusion.

2.2. Urgent measures do not need to be consulted and can be made under section 104 (1) of the Biosecurity Act 1993 by a CTO. The CTO can specify measures different to those in the IHS, to effectively manage risks of the kind arising from non-compliance.

2.3. The CTO Direction requires inspectors to sample all imported pelleted fodder beet seed lots (group 1) and pelleted vegetable seed lots (group 2), to send for testing at an MPI-approved testing laboratory.

2.4. Pelleted ornamental flower and greenhouse species (group 3) were considered to present the lowest risk for the introduction of unwanted or regulated, quarantine weeds and testing was initially deferred for this group.

2.5. MPI advised industry in September 2017 that pelleted ornamental flower and greenhouse species would now be sampled (at a ratio of 1 in every 10 seed lots) and sent for testing, to quantify the level of risk in this pathway.

"Analysis of other pelleted seeds has shown a high portion of contaminated seed lots and the same may be found in pelleted flower and greenhouse crop species."

"Data collected from these test results will be used as evidence for a further review of this pathway."

2.6. MPI are reviewing the pelleted seed pathways and intend to consult on permanent measures to include in the import health standard, to manage the risk from pelleted seeds.

2.7. Seed industries have been asked to clarify the pest management practices used offshore, pre- and post-harvest, to manage contaminants and weed seeds in production sites. MPI have also asked for information about the level of oversight by exporting country National Plant Protection Organisations (NPPO).

2.8. This paper provides further detail about the production practices in the ornamental flower seed supply chain, the verification and certification activities and level of NPPO oversight.

3. Impact of Border Testing

3.1. It is not possible to visually inspect pelleted seeds for unwanted or regulated, quarantine weed seeds, however border testing is expensive and wasteful. It occurs at the end-point in the supply chain, once all the costs have been accrued through

seed production, cleaning and processing, seed analysis, pelleting, packaging and export.

3.2. Applying a blanket sampling plan to all pelleted species means that ornamental flower and greenhouse seeds are tested disproportionately more than fodder and vegetable seeds (groups 1 & 2), and the financial impacts are therefore greater.

3.3. Group 3 imports comprise a large number of species and varieties (Appendix 1). A consignment will typically be made up of many small batches of different types of seed. The 1 in 10 sampling plan means that every consignment imported will have one or more batches of seed tested.

3.4. Group 3 seed is typically packed and sold in small foil packs, weighing from a few grams to 1kg of seed. Destructive testing of 31,540 seeds taken from a small foil pack has a greater impact than a sample taken from larger seed lots, such as those of groups 1 & 2.

3.5. To date, the direct costs of the seed testing process, including sampling and laboratory costs for just two NZPPI members has been in excess of $200,000. NZPPI estimates that over 250 tests have been performed and over 8 million pelleted seeds destroyed, and the cost to the wider industry is estimated at over $1,000,000.

4. Management of Risk

4.1. The Sanitary and Phytosanitary Agreement requires that members establish trade measures on the basis of an appropriate assessment of the actual risks involved and make known the level of risk they determined to be acceptable (Principle of risk analysis (Articles II and VI.1(b) of the IPPC).

4.2. When measures are introduced under urgency, MPI is not required to consult with members (SPS) or affected or interested parties (Biosecurity Act 1993). However there is an obligation for MPI to undertake a review of urgent ‘interim’ measures within a reasonable time frame to ensure they are no more trade-restrictive than they need to be.

4.3. The principle of minimal impact (Article VII.2(g) of the IPPC) requires that MPI considers lower-cost alternatives which can achieve the same level of protection.

4.4. MPI are reviewing the available measures to manage risk on these pathways and have stated a preference for managing risk offshore wherever possible.

5. Acceptable Level of Protection

5.1. Zero is not achievable in commercial seed production, and the concept of an Acceptable Level of Protection (ALOP) is therefore a practical alternative to what would otherwise be a very restrictive import policy.

5.2. The IHS does not specify an overall ALOP but uses a related concept, that of a Maximum Pest Limit (MPL), for regulated, quarantine weed seeds. This is set at 0.01%.

5.3. The IHS states that the MPL can be achieved by obtaining zero instances in a sample of 5kg. The use of a sample weight is erroneous (as it depends on the size of the seed) and the sample should be expressed in terms of units of seed.

5.4. The true purity level of a seed lot may still be high even if a small number of 'other' seeds are detected in a sample.

5.5. At least 250 border tests have been performed over the past nineteen months on group 3 seeds. NZPPI does not have access to the full set of data from testing, however members can confirm that there has not been a single instance where a regulated, quarantine weed seed has been found in batches subjected to testing.

5.6. Practical experience demonstrates that the production processes used in the pelleted ornamental flower and greenhouse seed pathways are effective at achieving high levels of seed purity (99.96 – 99.99%).

5.7. There have been only four instances where 'other' seeds have been found. Two of these instances were seeds with basic requirements under the IHS and the other two instances were species with scheduled requirements (*Agrostis* and *Petunia*).

5.8. The IHS doesn't state an ALOP or MPL for 'other' seed and this has effectively led to zero tolerance in the current border testing programme. It is NZPPI's understanding that in all four instances where 'other' seed was detected, the entire batch of seed was destroyed.

5.9. NZPPI believes that MPI must establish an MPL for 'other' seed to be transparent about the level of protection MPI finds acceptable for other seed contaminants relative to regulated, quarantine weed seed.

6. Risk Management in the Pelleted Ornamental Seed Pathway

6.1. Pelleted ornamental flower seeds are high value varieties and hybrids, selected from sophisticated breeding programs from some of the world's top seed

producers. NZPPI members deal mainly with five companies, whose seeds are distributed to over 80 countries.

6.2. These companies survive in a competitive marketplace because of their reputation for quality. They respond to customer feedback where their seed doesn't meet quality expectations. For example, Pan American strengthened their equipment cleaning protocols following feedback from NZPPI members about two instances of contamination, and there have been no further problems since.

6.3. The ornamental flower and greenhouse seed pathways differ from group 1 and 2 pathways in the scale of seed production, which is much smaller and enables greater precision and oversight in the growing, harvesting and handling processes.

6.4. Unlike other pelleted seed pathways, the commercial group 3 pathways are an integrated pathway, with additional quality controls post-clearance that help to ensure off-type plants aren't sold into retail or crop production markets.

6.5. It is useful to present and discuss the effectiveness of controls in place in these pathways by reference to a visual framework - the Bowtie risk management model (Figure 1).

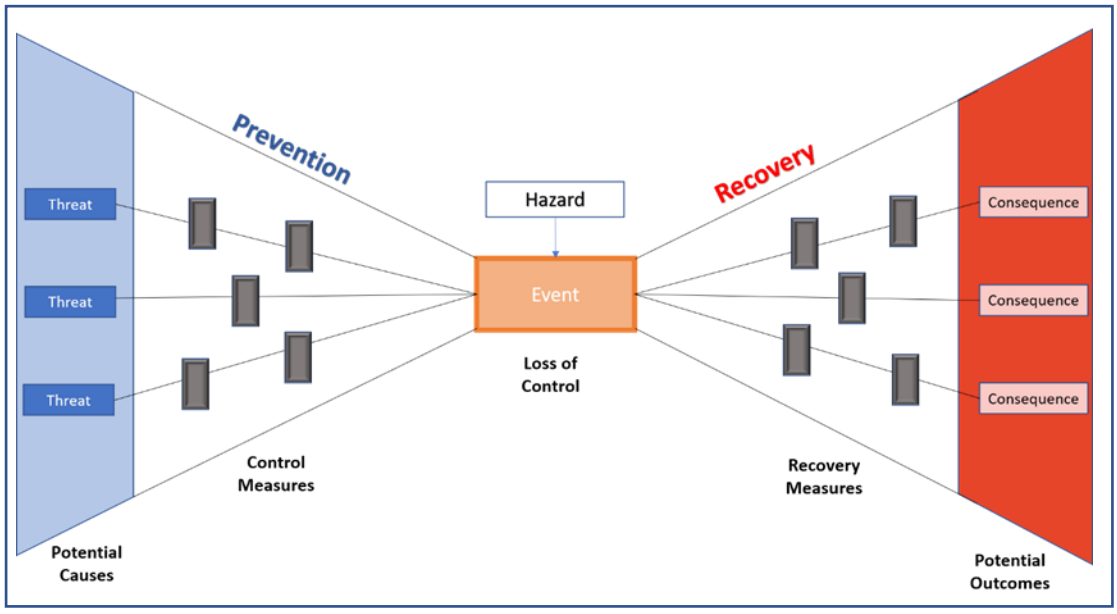

Figure 1: Bowtie framework for visualising risk management and communicating the context of the effectiveness of measures (controls) to manage phytosanitary risk and achieve an appropriate level of protection.

6.6. In the centre of the model, the Hazard is the activity with the potential for causing harm. The Event describes the point at which there is no longer adequate control

over the Hazard to prevent it from occurring. In this context, we have chosen to define the terms in relation to MPI's processes at the border, where:

a) the Hazard is the Importation of Pelleted Seed;
b) the Event is Border Clearance of Pelleted Seed Containing Unwanted or Regulated Seeds[2] or Pests.

6.7. Threats are the potential causes that could lead to the Event occurring unless they are managed with preventative controls. They are the reasons why or how the Event could occur. The threats that could be present in seed pathways include:

a) weed or non-target species in the place of production;
b) contaminated sowing equipment;
c) plant pathogens in place of production;
d) genetically modified varieties growing in the vicinity;
e) contaminated harvesting equipment;
f) harvesting other species along with target species;
g) seed cleaning processes are not effective at removing contaminants (e.g. due to similar size/dimension, electrostatic charges of seeds),
h) cross-contamination introduced during seed cleaning;
i) cross-contamination introduced during seed pelleting;
j) mixing up batches during seed labelling and dispatch.

6.8. The Bowtie model shows two types of measures: those that can be applied to reduce the likelihood of the Event occurring (preventative controls); and those that can be applied to reduce the likelihood of consequences once the Event has happened (recovery controls).

6.9. Preventative controls in seed production are applied throughout the process to pick up and address any quality problems as they occur so that they don't have an impact on the final product. These are presented in more detail in points 6.12 – 6.21.

6.10. Recovery controls ensure that if the Event occurs, the consequences are mitigated or minimised. These are presented in more detail in points 6.22 – 6.25.

[2] The detection of regulated weed seeds in fodder beet is central to the decision to introduce measures on the pelleted seed pathways. However other non-weed seeds have also been found in various pelleted seed pathways, some of which have phytosanitary requirements under schedules in the IHS. For the purposes of this model, we have included all 'other' seeds under the catch-all term 'regulated seeds'.

Preventative Control Measures

6.11. Clean seed starts with good field and production site controls to minimise the overall incidence of plant pests and diseases in harvested seed. Controls that are commonly employed in seed production sites include:

a) crop rotation to reduce pathogen build-up and weeds;
b) ploughing and the use of pre-emergence herbicides;
c) weed spraying, mechanical and hand roguing to remove other plant species.

6.12. Other controls that may be specifically applied in a given production site, as deemed necessary, include:

a) field-site soil sterilisation to reduce pathogen incidence.

6.13. Ornamental flower and greenhouse crops may be grown in the field under covered protection (netting or impermeable cover) or in production greenhouses. They are monitored closely throughout production, with multiple visits made for:

a) emasculation (for hybrid crosses);
b) pollination (for species that are hand pollinated); and
c) hand harvesting.

6.14. Hand harvested seed greatly reduces the likelihood that weed seeds or other foreign seeds will be harvested at the same time.

6.15. Tomato seeds are extremely unlikely to contain weed seeds as they are fully enclosed within a fruit and require extraction from tomato flesh. Other hand harvested seed is threshed using a vacuum harvester.

6.16. The first seed cleaning step removes inert material, small and deformed seed, and seed of other species if present. A sample of seed is analysed at this point and this determines the cleaning strategy and specific equipment which will be used to produce the final quality, pure seed.

6.17. The final seed cleaning may involve the following steps:

a) Sieving through multiple plates with specific sized holes to remove or grade different sizes of seed;
b) Removing unwanted fractions on gravity tables (based on mass, weight and shape);
c) Removing individual seeds using colour sorters.

6.18. Seed cleaning equipment and lines are flushed and cleaned thoroughly between batches of seed.

6.19. The cleaned seed is analysed again. Once the required level of seed purity is achieved, the seed is pelleted.

a) Strict controls are employed during seed pelleting processes.
b) Seed pelleting equipment is thoroughly cleaned between each batch of seed to prevent contamination.

6.20. Pelleted seed then undergoes further testing prior to sale, including:

a) Laboratory germination tests;
b) Field or greenhouse grow-out tests for germination and purity[3].

Recovery Measures

6.21. The commercial ornamental flower and greenhouse seed pathways differ from other pelleted pathways in having additional quality control measures during plant production in New Zealand.

6.22. Ornamental flower and greenhouse species are plug-grown for retail markets (punnets and potted colour) and greenhouse crop production. Off-type plants are highly visible during plant production and are not potted on for these markets.

6.23. Quality control measures applied post-clearance in the production facility are:

a) Seed is mechanically sown into plug trays and then monitored regularly for germination, purity and health;
b) Off-types are highly visible and discarded before dispatch to retail sale;
c) Any contamination is reported back to the seed importer and offshore seed supplier who then address the cause of the contamination in their quality control system (see 6.30).

6.24. Monitoring for off-type plants and weeding (post-clearance) is a highly effective recovery measure which mitigates the consequence following the loss of control Event.

Consequences

6.25. In the context of pelleted seeds, the range of potential negative consequences of the Event could include:

a) establishment of an unwanted or regulated, quarantine weed;

[3] This is an important step which was skipped in the production of contaminated fodder beet lots that were central to the NZ incursion of velvetleaf in 2016.

b) establishment of a regulated plant pathogen;
c) establishment of a new organism (including Genetically Modified organisms).

6.26. Groups 1 & 2 seeds are broad-acre or field-sown crops, which could result in moderate- or large-scale consequences if no recovery measures are applied (e.g. pelleted velvetleaf in fodder beet seed). Pelleted ornamental and greenhouse species are sown in smaller, controlled production environments and the magnitude of the consequences will be comparatively much smaller.

6.27. Group 3 production is relatively small-scale and often involves mixed species. The small number of suitable host plants in the immediate vicinity and close monitoring make it very unlikely plant pathogens will establish in the New Zealand environment.

6.28. *Petunia* is the only group 3 species with a genetically modified (GM) variety that has been historically propagated overseas. GM *Petunia* is considered a new organism under the Hazardous Substances and New Organisms Act (HSNO) 1996. The IHS schedule for *Petunia* requires certification that seed is not GM.

6.29. *Petunia* seed was found as a contaminant in one batch of group 3 pelleted seed during border testing. The source of the contamination was traced back to the pelleting equipment used at Pan American seed (they also produce pelleted *Petunia* seed). They have subsequently strengthened their cleaning protocols and no further instances have occurred.

6.30. Pan American do not grow GM varieties of Petunia seed and all batches imported into New Zealand are tested and certified. It is extremely unlikely that contaminant *Petunia* seed would be a GM seed. The consequences should a contaminant *Petunia* grow in the New Zealand environment is zero, as *Petunia* does not self-seed in New Zealand and therefore cannot form a self-sustaining population.

6.31. A small number of pelleted ornamental flower seeds are sold in packets to home gardeners. The risk is negligible that small quantities of high-purity seed sown in home gardens would lead to negative consequences in New Zealand.

7. Alternative measures

7.1. The purity of a pelleted seed lot cannot be determined through visual inspection at the border, and alternative measures are needed to verify that seed meets the required standards of purity.

7.2. MPI are currently reviewing alternative requirements for the IHS and NZPPI understands the preference is to manage risk offshore wherever possible.

7.3. Offshore seed certification programmes are available for arable and cereal species in many member countries, usually with a very good level of oversight from National Plant Protection Organisations (NPPO).

7.4. However, these types of programmes are not available for ornamental flower and greenhouse species. The requirement for testing and NPPO oversight is not specified by other trading countries and such a system would be a unique requirement for the New Zealand market.

7.5. New Zealand is a small, relatively low value market in the global context. The basis for the willingness to supply the NZ market is largely through relationships with NZ seed importers and the professionalism of the industry. It is extremely unlikely that suppliers would be willing to develop export programmes in order to continue to supply the New Zealand market.

7.6. Where offshore certification or NPPO oversight is not possible, MPI must take a systems approach which puts more emphasis on other parts of the system to manage risk. Recovery controls during plant production ensure that no 'other' plants are introduced into the New Zealand environment. NZPPI suggests this approach is entirely appropriate for the pelleted ornamental flower and greenhouse seed pathways.

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Appendix 1: List of Group 3 pelleted species

Greenhouse species

Lactuca sativa
Solanum lycopersicum

Ornamental flower & herb species

Ageratum houstonianum
Anethum graveolens
Antirrhinum sp.
Angelonia salicariifolia
Begonia sp.
Bellis perennis
Calceolaria sp.
Calibrachoa hybrida
Campanula sp.
Celosia sp.
Chaenorhinum sp.
Cineraria maritima (= Senecio cineraria)
Chrysanthemum sp
Dianthus sp.
Diascia barberae
Dichondra sp.
Digitalis sp.
Exacum affine
Eruca sativa
Gazania sp.
Geranium sp.
Gerbera jamesoni
Gloxinia speciosa (= Sinningia speciosa)
Gypsophila sp.
Helichrysum sp.
Heuchera sp.
Isolepis sp.
Juncus sp.
Laurentia axillaris (= Isotoma axillaris)
Linaria sp.
Lisianthus russellianus (= Eustoma grandiflorum)
Lobelia sp.
Lobularia maritima
Mimulus sp.
Nemesia sp.
Nicotiana sp.
Ocimum basilicum
Origanum vulgare
Papaver sp.
Pentas sp.
Pericallis hybrida (= Pericallis xhybrida)
Petroselinum crispum
Petunia sp.
Portulaca sp.
Primula sp.
Pyrethrum sp.
Ranunculus sp.
Rosmarinus officinalis
Rudbeckia sp.
Salpiglossis sinuata
Salvia officinalis
Saxifraga sp.
Senecio cruentus (= Pericallis cruenta)
Silene sp.
Solenostemon scutellarioides
Streptocarpus sp.
Sutera sp. Tagetes sp.
Tanacetum parthenium
Thymus vulgaris
Torenia fournieri
Trachelium caeruleum
Verbascum sp.
Verbena sp.
Veronica sp.
Viola sp.
Zinnia