

Rationale for changes to the inspection protocol for imported seeds for sowing

- 1) Biosecurity NZ has recently adopted a new sampling protocol for seeds for sowing that appropriately targets risk from contaminants that are quarantine weed species¹.
- 2) The new sampling protocol **does not** change the tolerance for quarantine weed seeds in imported seed lots in the Seeds for Sowing IHS. This continues to be 0.01% (1 quarantine weed seed per 10,000 seeds).
- 3) The new sampling protocol **only** changes the way BNZ inspectors verify that the requirements are met. We have set new sampling rates that give inspectors 95% confidence that they can detect more than 1 quarantine weed seed per 10,000 seeds on different pathways.
- 4) In the past inspectors used to inspect a 5x the International Seed Testing Association (ISTA) sample size for all seeds. Now they will inspect a 5xISTA sample for **only** 71 species that have a higher risk of containing quarantine weed seeds. They will inspect a reduced sample size of 2xISTA for all other seed species.
- 5) BNZ is **maintaining** the 5xISTA sampling rate for 71 species in Appendix 1, because:
 - a. We consider these pathways have a higher risk of containing quarantine weed seeds based on past interceptions. Quarantine weed seeds were intercepted on all these pathways since 2018.
 - b. We are also aware of the difficulty in visually detecting weed seeds in these types of seeds, particularly weed seeds that look very alike the host seed. "Efficacy of detection" is one of the considerations that need to be made when designing a sampling plan².
 - c. For these 71 species we have assumed a conservative "efficacy of detection" of 25%. This value is close to the lower end of the range of experimentally determined efficacies of detection for various weed/host seed combinations in a recent scientific study³. This efficacy of detection is assumed for these species because we want to ensure that difficult to detect quarantine weed seeds are not missed in samples by our inspectors. Even low levels of quarantine weed seed contamination in lots of these species can establish to cause unwanted impacts, as shown by the 2021 blackgrass incursion in Canterbury.
 - d. A 5x ISTA sample contains 125,000 seeds for most species. Assuming an "efficacy of detection" of 25%, finding zero quarantine weed seeds in this sample gives 95% confidence that there is no more than 1 quarantine weed seed in 10,000 seeds in a seed lot.
- 6) BNZ is **reducing** the sample size to 2xISTA for all other seeds, because:
 - a. We consider these pathways have a low risk of containing quarantine weed seeds. Quarantine weed seeds were never detected on any of these pathways since 2018.
 - b. We have assumed a less conservative efficacy of detection of 60% for these seeds, which is consistent with the low risk of these pathways. Sixty percent (60%) is the average of the experimental efficacy of detection for all host/contaminant classes assessed by trained individuals in a recent scientific study².

¹ From MPI's Schedule of (Regulated) Quarantine Weed Seeds (<https://www.mpi.govt.nz/dmsdocument/7111>)

² From *ISPM 31: Methodologies for sampling of consignments* (https://www.ippc.int/static/media/files/publication/en/2016/11/ISPM_31_2008_Sampling_of_consignments_EN.pdf)

³ From Buddenhagen et al (2022) (<https://scijournals.onlinelibrary.wiley.com/doi/full/10.1002/ps.7257>)

- c. A 2x ISTA sample contains 50,000 seeds for most species. Finding zero quarantine weed seeds in this sample gives 95% confidence that there is no more than 1 quarantine weed seed in 10,000 seeds in a seed lot, if the efficacy of detection is 60%.
- 7) In summary, the changes to our sampling do not have any effect on the requirements that seed for sowing importers need to meet or the tolerance for quarantine weed seeds of 0.01%. The intent of the change is to reduce the time and cost associated with inspections of seeds for sowing for the majority of imported seed lots, while ensuring that the biosecurity risk associated with quarantine weed species entering New Zealand is being appropriately managed.

APPENDIX 1: SEED FOR SOWING SPECIES WHICH WILL HAVE A 125,000 SEED SAMPLE DRAWN FOR QUARANTINE WEED SEED INSPECTION

Species
<i>Allium cepa</i>
<i>Alyssum montanum</i>
<i>Amaranthus cruentus</i>
<i>Amelanchier alnifolia</i>
<i>Ammi visnaga</i>
<i>Anethum graveolens</i>
<i>Apium graveolens</i>
<i>Avena sativa</i>
<i>Beta vulgaris</i>
<i>Brassica campestris</i>
<i>Brassica juncea</i>
<i>Brassica napus</i>
<i>Brassica rapa</i>
<i>Bupleurum rotundifolium</i>
<i>Calendula officinalis</i>
<i>Cannabis sativa</i>
<i>Cannabis sativa (Low THC Hemp varieties only)</i>
<i>Cenchrus clandestinus</i>
<i>Chrysanthemum coronarium (= Glebionis coronaria)</i>
<i>Cichorium intybus</i>
<i>Cosmos bipinnatus</i>
<i>Cosmos sulphureus</i>
<i>Cucurbita pepo</i>
<i>Cynodon dactylon</i>
<i>Dactylis glomerata</i>
<i>Daucus carota</i>
<i>Delphinium ajacis</i>
<i>Dianthus barbatus</i>
<i>Diplotaxis tenuifolia</i>
<i>Echinochloa esculenta</i>
<i>Eragrostis tef</i>

Species
<i>Festuca arundinacea</i> (= <i>Lolium arundinaceum</i>)
<i>Festuca rubra</i>
<i>Foeniculum vulgare</i>
<i>Helianthus annuus</i>
<i>Hordeum vulgare</i>
<i>Linanthus grandiflorus</i>
<i>Linaria maroccana</i>
<i>Linum usitatissimum</i>
<i>Lolium arundinaceum</i>
<i>Lolium multiflorum</i>
<i>Lolium perenne</i>
<i>Medicago sativa</i>
<i>Melissa officinalis</i>
<i>Monarda didyma</i>
<i>Myosotis alpestris</i>
<i>Nasturtium officinale</i>
<i>Ocimum basilicum</i>
<i>Papaver rhoeas</i>
<i>Paspalum vaginatum</i>
<i>Pennisetum clandestinum</i> (= <i>Cenchrus clandestinus</i>)
<i>Perilla frutescens</i>
<i>Petroselinum crispum</i>
<i>Phacelia campanularia</i>
<i>Phacelia tanacetifolia</i>
<i>Phleum pratense</i>
<i>Physalis pruinosa</i>
<i>Raphanus sativus</i>
<i>Rumex acetosa</i>
<i>Sarcocornia quinqueflora</i>
<i>Sorghum sudanense</i>
<i>Spinacia oleracea</i>
<i>Stevia rebaudiana</i>
<i>Trifolium michelianum</i> var. <i>balansae</i>

Species
<i>Trifolium pratense</i>
<i>Trifolium repens</i>
<i>Trifolium resupinatum</i>
<i>Trifolium subterraneum</i>
<i>Triticum aestivum</i>
<i>Triticum durum</i>
<i>Valerianella locusta</i>