



## RISK BACKGROUND

### Brassicaceous seed for sowing requiring treatment

#### Overview



(Image: *Brassica rapa* seeds<sup>1</sup>.)



(Image: *Raphanus sativus* seeds<sup>1</sup>.)



(Image: *Eruca vesicaria* seeds<sup>1</sup>.)

*Brassica rapa*, *Eruca vesicaria* and *Raphanus sativus* seeds that are imported for sowing do not require an import permit, but consignments must be:

- labelled with the full botanical name
- in new, clean packaging
- compliant with Australia's seed purity requirements to minimise contaminant risks (for >10 kg seed lots only)
- inspected on arrival
- treated according to Australian requirements, depending on the seed-borne pathogens associated with the seed.

Importers and department staff must ensure that all BICON conditions are met and that goods are free from biosecurity risks, as well as the key risks described below.

#### Key risks

Seeds of *Brassica rapa* (e.g. turnips, bok choy), *Eruca vesicaria* (e.g. rocket) and *Raphanus sativus* (e.g. radish) can harbour seed-borne pathogens of biosecurity concern, as well as a range of biosecurity risk material.

##### Anthracnose

*Colletotrichum higginsianum* is a fungal pathogen that causes anthracnose leaf spot disease in *Brassica rapa* and *Raphanus sativus*<sup>2</sup>. Its seed-borne nature makes long-distance transmission possible, causing considerable economic consequences. The biosecurity risk of this pathogen in imported seed is mitigated with a broad-spectrum seed fungicide, or heat treatment (dry heat or hot water treatment).

##### Fusarium wilt

*Fusarium oxysporum* f. sp. *raphani* causes fusarium wilt disease in *Raphanus sativus* and *Eruca vesicaria*<sup>2</sup>. It can spread rapidly through the seed pathway, as it infests the seed coat and presents no visual symptoms.

In radish, infection of plants may result in leaf yellowing, premature leaf drop and stunting<sup>3</sup> (Figure 1). The risk of this pathogen is managed through treatment with a broad-spectrum fungicide.

#### Other pathway risks

Imported seeds may harbour a range of other biosecurity risk material, including live insects, disease symptoms, and contaminants such as soil, weed seeds, hitchhiker pests (e.g. [Khapra beetle](#)) and trash. These biosecurity risks are managed through standard seed import conditions, including purity testing for seed lots greater than 10 kg and inspection on-arrival.



**Figure 1: Symptoms of Fusarium wilt<sup>4</sup>.**

Left: Control plants; Right: *Raphanus sativus* infected with *Fusarium oxysporum* f. sp. *raphani*

<sup>1</sup>USDA, NRCS. 2019. The PLANTS Database (<http://plants.usda.gov>, 2019). National Plant Data Team, Greensboro, NC 27401-4901 USA.)

<sup>2</sup> Department of Agriculture 2019, Final review of import conditions for brassicaceous vegetable seeds for sowing, Department of Agriculture, Canberra, Australia, available at: <http://www.agriculture.gov.au/biosecurity/risk-analysis/plant/brassicaceous-crop-seeds> (pdf 3.1 MB).

<sup>3</sup> Rimmer, SR, Shattuck, VI & Buchwaldt, L 2007, *Compendium of Brassica diseases*, The American Phytopathological Society, St. Paul, Minnesota, USA.

<sup>4</sup>du Toit L J, 2003, *Wilt of Radish Caused by Fusarium oxysporum* f. sp. *raphani* in Washington State, Plant Management Network, ST Paul, Minnesota, USA.