

SASA



How to guard against existing and new disease threats

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Outline

- ❖ Potato pest and disease threats – some examples
- ❖ Major bacterial diseases threats
- ❖ Common infection routes & ‘Drivers for change’
- ❖ What is government doing?
- ❖ What can industry/growers do?
- ❖ Conclusions

Pest and disease threats: Examples

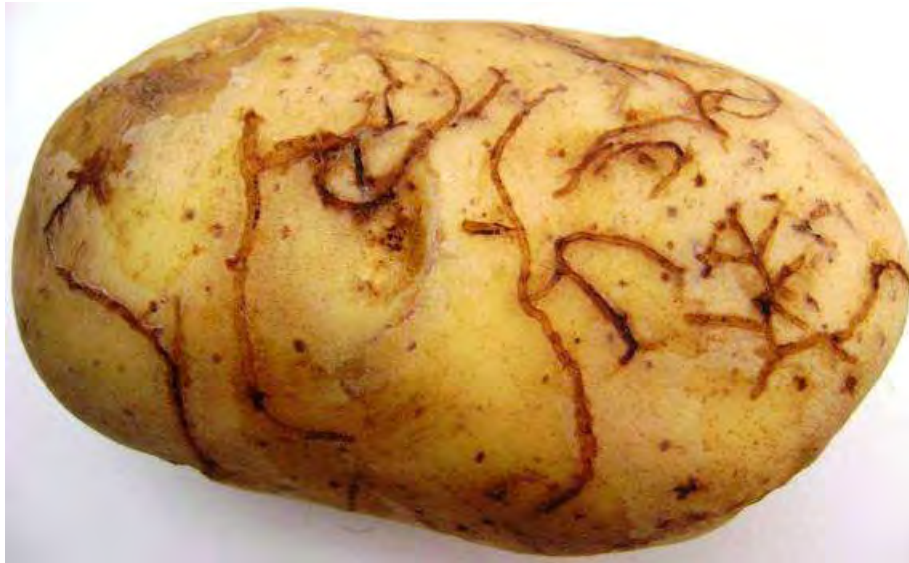
- ❖ Potato spindle tuber viroid (PSTVd) and related pospiviroids
 - Ornamentals and weeds may facilitate transmission

- ❖ *Synchytrium endobioticum* (wart disease)
 - Fungus can persist in soil for long periods
 - Recent findings in Bulgaria & Turkey

- ❖ *Epitrix similaris* (flea beetle)
 - First reported in Portugal (2004), still spreading
 - Larvae cause corky lesions and superficial warty growths on potato tubers

- ❖ *Candidatus Liberibacter psyllaeus* (zebra chip)
 - Transmitted by the potato/tomato psyllid
 - Found in Canada, Guatemala, Honduras, New Zealand & USA

Pest and disease threats: Examples



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Major bacterial diseases threats

- ❖ Brown rot (*Ralstonia solanacearum*)
 - Causes wilts and vascular rots of tubers
 - Traditionally a tropical/warm temperate pathogen - Europe (Sweden, 1972)
 - Spread by infected tubers and infested irrigation water

- ❖ Ring rot (*Clavibacter michiganensis* subsp. *sepedonicus*)
 - Causes wilts, leaf curl, chlorosis and vascular rots of tubers
 - Long established in Germany, Poland and Scandinavia
 - Spread by infected tubers and contaminated equipment/transport

- ❖ *Dickeya* spp.
 - Causes wilts/blackleg and tuber soft rots
 - Reports from Belgium, Finland, France, Israel, the Netherlands, Poland and UK
 - Spread by infected tubers and infested irrigation water (?)

Ralstonia solanacearum: Brown rot



Clavibacter michiganensis subsp. *sepedonicus*: Ring rot



Photos: Courtesy of Solke de Boer, Canadian Food Inspection Agency. Ian Carr & Martyn Deans, PHSI

Dickeya spp.

- ❖ Two major pathogens affecting potato in Europe
 - *Dickeya dianthicola*
 - ‘*Dickeya solani*’

- ❖ ‘*D. solani*’ emerged in continental Europe ~ 2005-2006

- ❖ In less than 5 years has become the predominant cause of blackleg in some European countries

- ❖ To date ‘*D. solani*’ has never been found in Scottish-origin potatoes

'*Dickeya solani*': Symptoms in the field



'*Dickeya solani*': Tuber symptoms



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Infection routes

- ❖ Import of potatoes for planting (ware & seed)
 - Highest risk; seed more so

- ❖ Import of potatoes for processing
 - Poor separation. Infested/infected soil/debris/waste

- ❖ Physical contact
 - Contaminated equipment/containers/transportation

- ❖ Alternative hosts
 - Tomato, *Pelargonium*, *S. dulcamara*, Hyacinth, etc.

- ❖ Soil, water, air

'Drivers for change'

❖ Trade

- Industry rationalisation
- Outsourcing/sub-contracting
- Diversification
- Supermarket purchasing policies
- EU enlargement

❖ Climate change

- Increase the range, distribution, activity and/or exposure to pests and vectors
- Increase severity of symptoms – PVY^{NTN}, *Dickeya*, etc.

What is government doing?

- ❖ Quarantine controls
 - Cultivation of non-EU potatoes prohibited
 - Entry as disease-tested micro-plants

- ❖ Surveillance
 - Routine testing for quarantine diseases (PCN, brown rot, ring rot, etc.)

- ❖ Control measures
 - EU Directives
 - Where appropriate local measures can be introduced
 - Separation of seed and ware, PP1 forms, *Dickeya* legislation, etc.

- ❖ R&D
 - Potato Council

Surveillance: Bacterial diseases

- ❖ *Clavibacter michiganensis* subsp. *sepedonicus* (ring rot)
 - EU (incl. Poland) surveillance 2009;
 - 51 positives from 49,050 seed samples
 - 1,222 positives from 21,780 ware samples
 - UK surveillance; 1,860 seed and 623 ware samples - no positive findings

- ❖ *Ralstonia solanacearum* (brown rot)
 - EU surveillance 2009;
 - 6 positives from 47,666 seed samples
 - 35 positives from 8,774 ware samples
 - 378 positives from 5,360 water samples
 - UK surveillance; 1,873 seed 606 ware samples - 3 ware findings in England & Wales (linked to the same Dutch input seed)

Surveillance in Scotland: *Dickeya* spp.

- ❖ Pre-planting test for all non-Scottish origin seed potatoes (seed and ware production)
- ❖ All seed and ware planted with non-Scottish origin seed inspected for blackleg and lab tested when found
- ❖ All dangerous contacts (~ links to known positives, vicinity of infested water, etc.) inspected for blackleg and lab tested when found
- ❖ As above, for 10% sample of Scottish seed/ware crops
- ❖ Every irrigation source to be tested over a 3-year rolling programme
 - Infested rivers sampled more intensively

Scottish control programme: *Dickeya* spp.

- ❖ Zero tolerance for all *Dickeya* species in the Scottish Seed Potato Classification Scheme from 2010
- ❖ Where *Dickeya* is found, no tubers from the crop will be permitted for planting
- ❖ All crop waste (including soil and brock) controlled to prevent further spread
- ❖ Ground keepers controlled in the affected field for two years
- ❖ All machinery and boxes which have been in contact with the stock to be cleaned and disinfected
- ❖ In the case of infested watercourses growers in the vicinity will be informed and localised irrigation bans may be imposed
- ❖ **It is illegal to plant seed potatoes infected with *Dickeya* in Scotland**

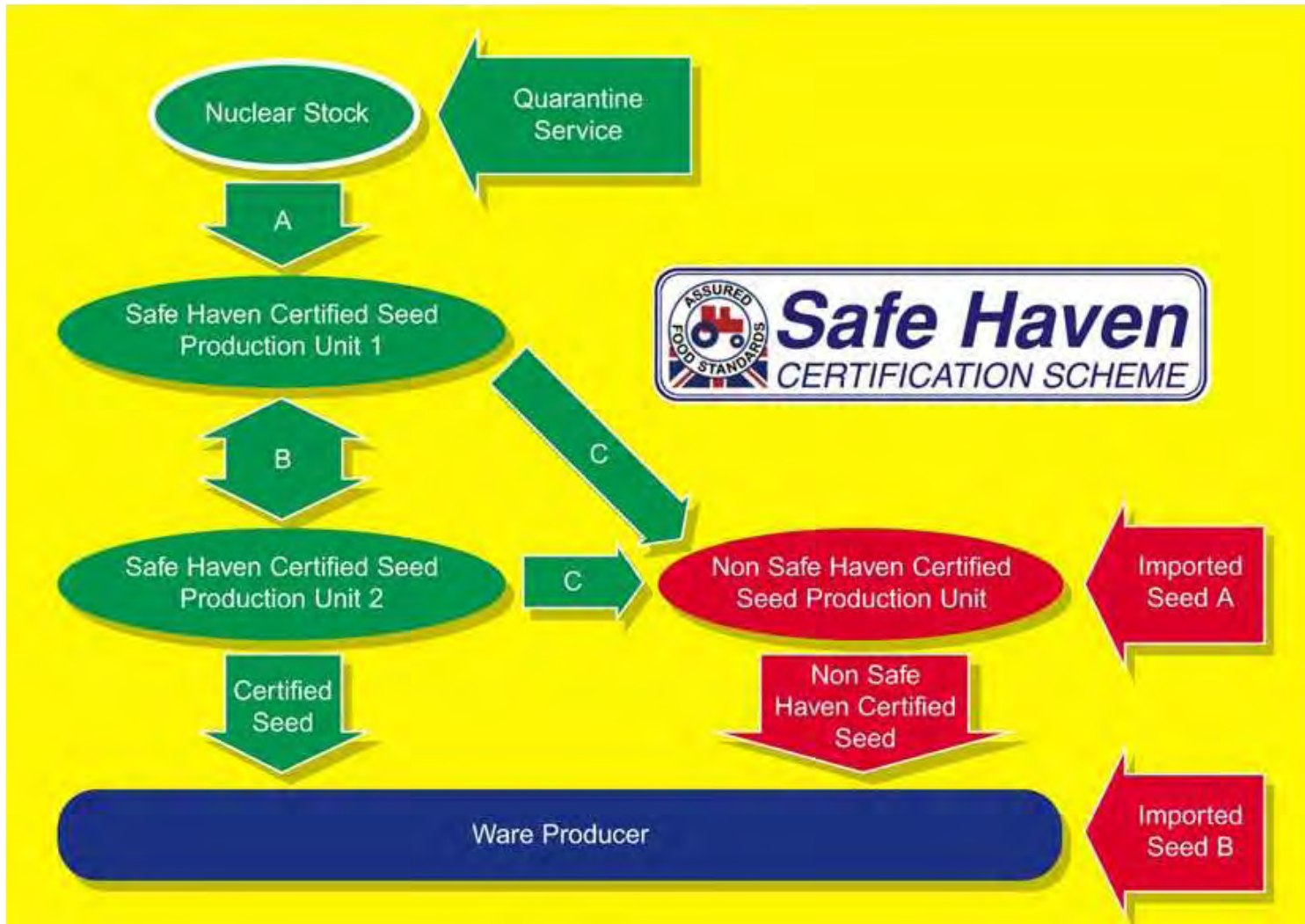
What can industry/growers do?

- ❖ Consider where you source your seed and potatoes from
 - Industry-lead voluntary ban on seed imports
 - ~99.5% seed potatoes produced in Scotland originate from Scotland
 - Risk of brown rot, ring rot and *Dickeya* is higher with imported seed
 - Join the Safe Haven Scheme

- ❖ Apply strict separation of seed and ware potatoes
 - Risks particularly high for grower/merchants
 - Non-returnable bags
 - Clean and disinfect machinery, containers, etc.
 - Think about how tasks are ordered: Low risk → High risk

- ❖ Take care with the disposal of soil and waste

The Safe Haven Scheme



Industry measures: Balancing costs and risks

❖ Costs

- Membership of Safe Haven Scheme, additional bureaucracy, cleaning regime, box management/replacement, new bags etc.

❖ Risks

- Loss of crop and dangerous contact crops, cost of destruction and disposal, cost of remedial cleaning and disinfection, future restrictions (field, store, farm, irrigation source, etc.)

Conclusions

- ❖ Potatoes are susceptible to many damaging pests and diseases
 - Globalisation, climate change etc. likely to increase risks in future

- ❖ Government must play its part, but there are limitations...
 - Surveillance & control: Halted spread and stabilised findings – But will it lead to eradication?
 - Surveillance/sampling does not guarantee detection

- ❖ Industry/growers can take measures to ensure they remain free of disease
 - Seed, equipment, containers, contractors, hygiene
 - Increase in costs balanced against consequences of a positive finding

- ❖ Only by Government and Industry working in partnership will we maintain our reputation for producing healthy potatoes