Seed Potatoes Certification - influencing potato disease management by flattening the curve

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Australian Seed Potato Certification Authority (AuSPICA)

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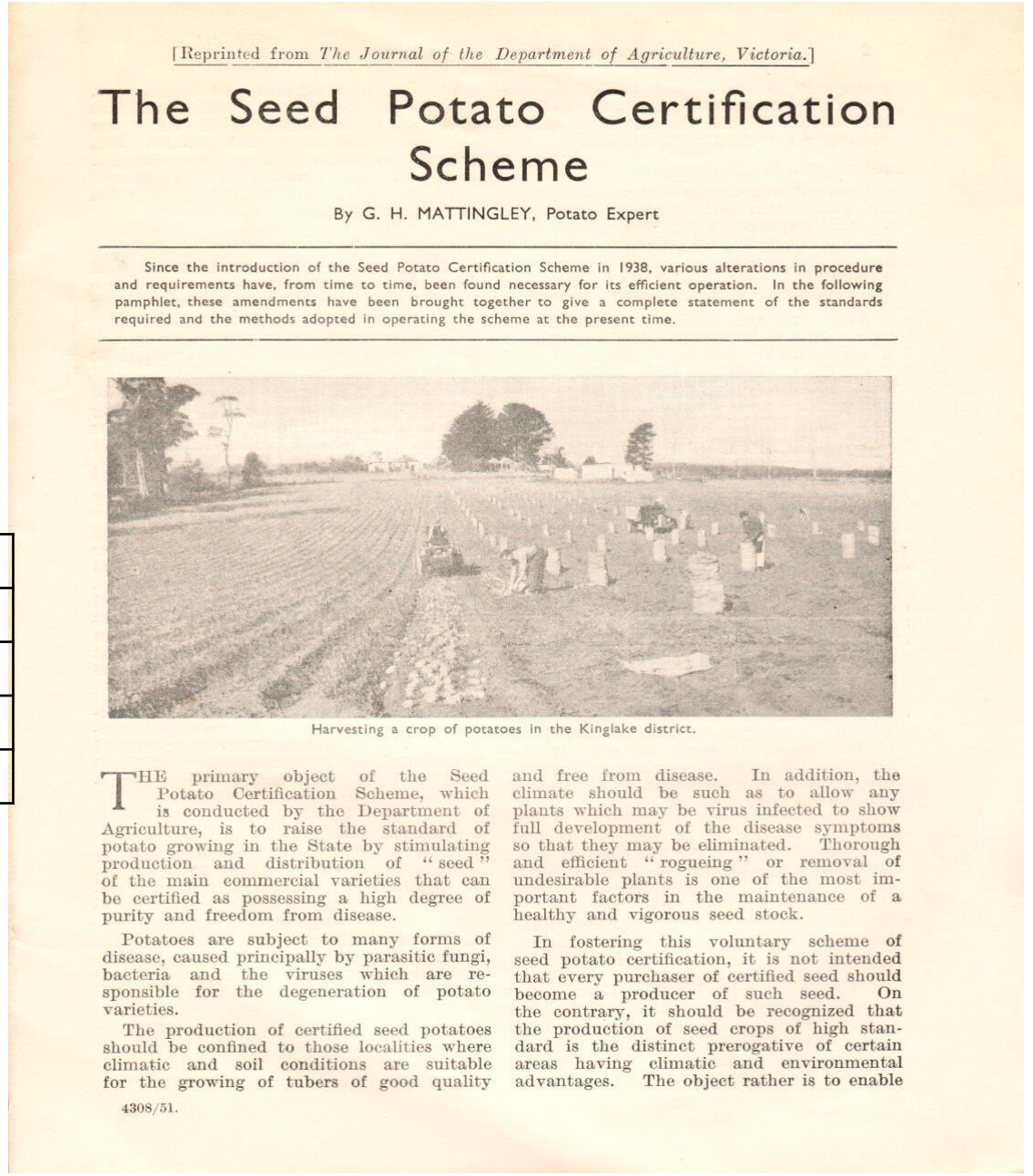
The Seed Potato Certification Scheme has continuously operated in Australia since **1938**

- **South Australia, Victoria and New South Wales**

Year	Tonnes of certified seed potatoes produced per label class			
	BLACK	RED	BLUE	TOTAL
2020/21	1,820	37,980	1,026	40,825
2021/22	1,365	32,077	1,128	34,569
2022/23	3,128	36,908	561	40,596

ANNUAL FARM GATE $32M AUD (SEED)

INDUSTRY VALUE $1B AUD



[Reprinted from *The Journal of the Department of Agriculture, Victoria.*]

The Seed Potato Certification Scheme

By G. H. MATTINGLEY, Potato Expert

Since the introduction of the Seed Potato Certification Scheme in 1938, various alterations in procedure and requirements have, from time to time, been found necessary for its efficient operation. In the following pamphlet, these amendments have been brought together to give a complete statement of the standards required and the methods adopted in operating the scheme at the present time.

Harvesting a crop of potatoes in the Kinglake district.

THE primary object of the Seed Potato Certification Scheme, which is conducted by the Department of Agriculture, is to raise the standard of potato growing in the State by stimulating production and distribution of "seed" of the main commercial varieties that can be certified as possessing a high degree of purity and freedom from disease.

Potatoes are subject to many forms of disease, caused principally by parasitic fungi, bacteria and the viruses which are responsible for the degeneration of potato varieties.

The production of certified seed potatoes should be confined to those localities where climatic and soil conditions are suitable for the growing of tubers of good quality and free from disease. In addition, the climate should be such as to allow any plants which may be virus infected to show full development of the disease symptoms so that they may be eliminated. Thorough and efficient "rogueing" or removal of undesirable plants is one of the most important factors in the maintenance of a healthy and vigorous seed stock.

In fostering this voluntary scheme of seed potato certification, it is not intended that every purchaser of certified seed should become a producer of such seed. On the contrary, it should be recognized that the production of seed crops of high standard is the distinct prerogative of certain areas having climatic and environmental advantages. The object rather is to enable

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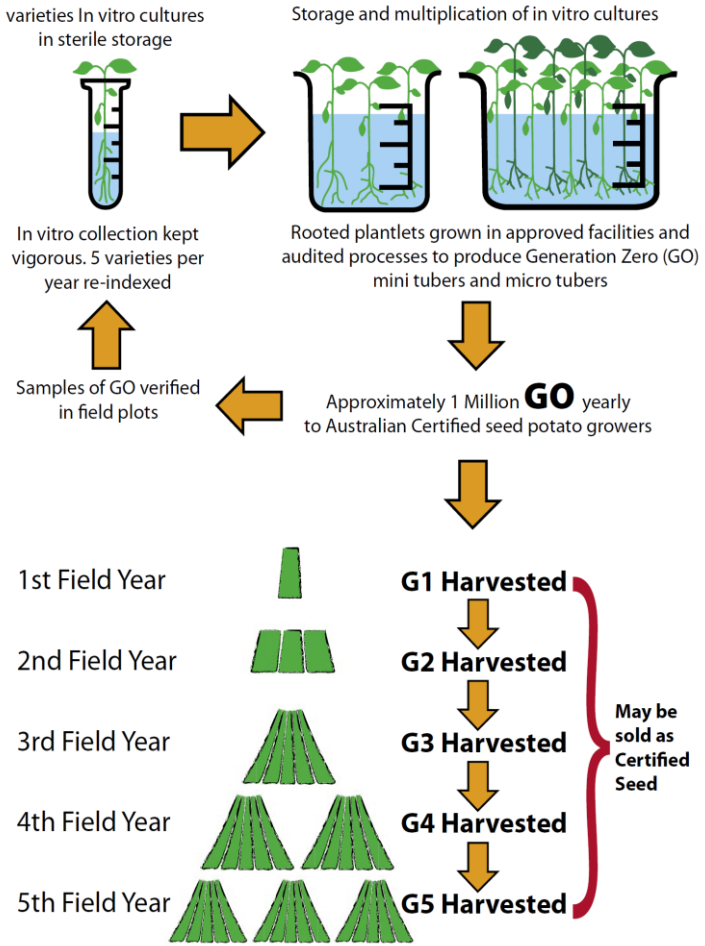

Potatoes are clonally propagated

Seed Potato Certification

Limited generation multiplication

"Clean" minitubers

Limited 5 field generations multiplication

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Pest and Disease Surveillance

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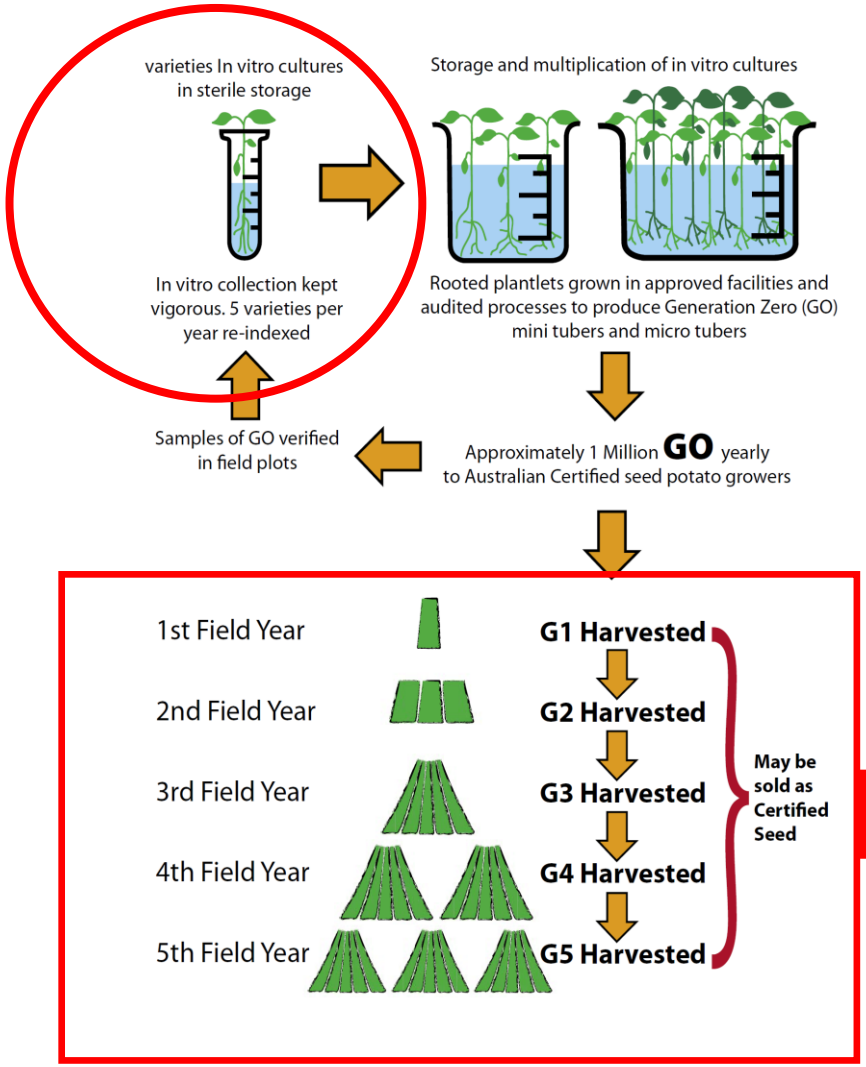

SURVEILLANCE 1: Pest Introduction Pathway
Restricted introduction of material into the tissue culture accreditation. Includes endemic and exotic pests
Evidence: Diagnostic testing records

SURVEILLANCE 2: Passive and targeted surveillance
Visual crop inspections and targeted diagnostics
Evidence: Geospatial referenced and surveillance data

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DATA CAPTURE - DATABASE

Evidence

=

Trade

ispection

Crop: 53557 - Lady Christl B

Inspector: Barry Strahan

Result: Part Rejected

Isolation Row ☑

Inspection No: 2 Status: Finalised

Inspection Date: 01/02/2022

Date Planted: 01/12/2021

Days After Planting: 62

Save

Cancel

Observations

Type	Description	ZT	Affected (Ha)	%	Count	LS Number	Pos/Neg	Yes/No	Notes
Bacteria	Blackleg - Dickeya dianthicola	STOP	0.0000				P N		
Bacteria	Blackleg - other than Dickeya dia		0.0000	0.00	0				
Bacteria	Brown rot (Bacterial wilt)	STOP	0.0000	0.00	0			Y N	
Bacteria	Ring rot (Clavibacter michiganen	STOP	0.0000	0.00	0			Y N	
Bacteria	Zebra chip (Psyllid yellows)	STOP	0.0000	0.00	0			Y N	
Impurity	Foreign Variety Mix		0.0000	0.30	0				purple flower mix not rogued
Virus	Alfalfa mosaic virus		0.0000	0.00					
Virus	Potato leafroll virus		0.0000	0.00	0				
Virus	Potato mop-top virus (spraing of	STOP	0.0000					Y N	
Virus	Potato spindle tuber viroid (PSTV	STOP	0.0000	0.00	0			Y N	
Virus	Potato virus Y		0.0000	0.00		1214B			
Virus	Tomato spotted wilt virus (TSWV)		0.0000	0.00	0				

Notes:

Crop going down. Part rejected 0.16Ha because mix was not rogued.

Review Notes (Internal use only)

Field ratings

% of Plants	Rating 1		Rating 2		Rating 3		Rating 4	
Inspection	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**	**1st**	**2nd**
Foreign Varieties	0.05	0.00	0.10	0.01	0.10	0.10	0.10	0.10
Virus diseases	0.10*	0.01	0.25	0.10	1.00	1.00	4+	4+
Other diseases	0.25	0.10	0.50	0.25	2.00	2.00	2	2
Total Diseased plants	0.25	0.10	0.50	0.25	2.00	2.00	6.0+	6.0+

Table 1. Maximum Tolerances for Diseases and Foreign Varieties

**0.10 = 1 plant in one thousand + Potato Virus Y only all other virus tolerance as per rating 3*

AUSTRALIAN CERTIFIED SEED POTATOES

H

I

AuSPICA does not laboratory test for variety purity

A

Red

R20 VIC 5849 48817 101

LOCATION: **TOOLANGI**

C B

D

STATE: **VIC**

VARIETY: Public E

F **ATLANTIC**

GEN **4**

RATING: 1 G

GROWER: **A SEED GROWER**

DATE PACKED: K

J

DATE PRINTED: 07-05-2020

QA GROWER: No L

PCN TESTED: 13777

VIRUS TEST: 423B M

N **R20 VIC 5849 48817 101**

Modification to label will invalidate certification

O **Refer to other side of label for definition of certification and growers declaration**

AuSPICA provides seed potato certification and a range of other professional services to the Australian potato industry

www.auspica.org.au email auspica@auspica.org.au Tel: (+61) 03 5962 9000

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PRODUCE OF AUSTRALIA

SHORT COMMUNICATION

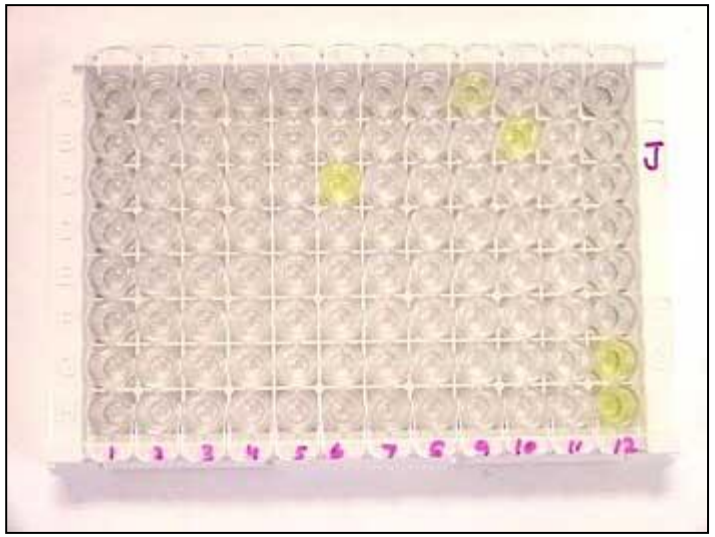
The Recombinant Potato virus Y (PVY) Strain, PVY^{NTN}, Identified in Potato Fields in Victoria, Southeastern Australia

Mariana Rodriguez-Rodriguez, Mohamad Chikh-Ali, Steven B. Johnson, Stewart M. Gray, Nellie Malseed , Nigel Crump, and Alexander V. Karasev

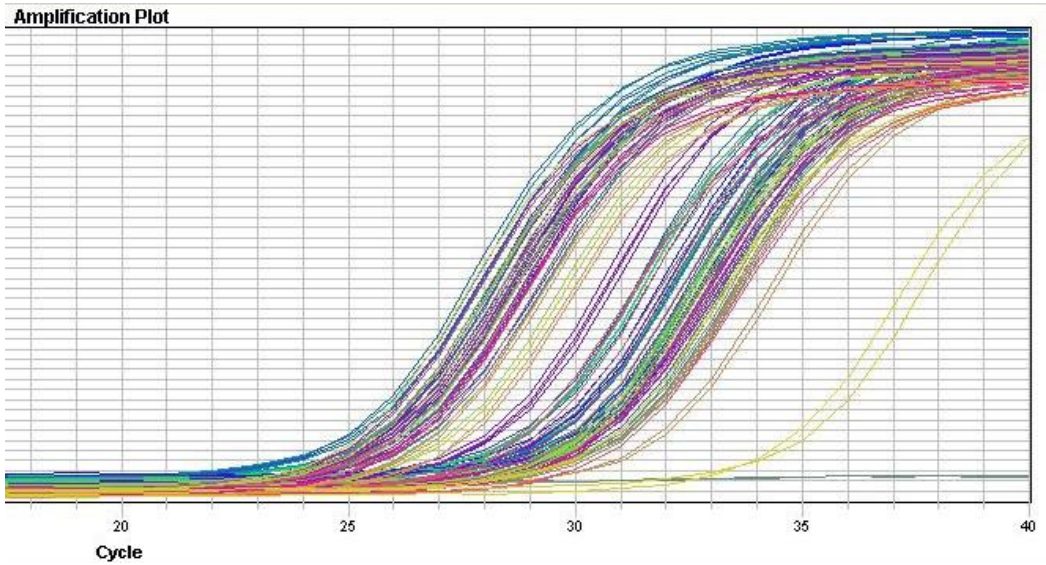
Published Online: 15 Oct 2020 | https://doi.org/10.1094/PDIS-05-20-0961-SC

Potato Virus Y (PVY)

- Non persistent virus
- Aphid vector and mechanical transfer
- Yield and quality loss >90%
- Since 2009 - For each 5 ha of seed crop a 200 leaf/tuber sample tested for PVY
- Each test is done on 20 subgroups comprising of 10 leaves or tubers
- In 2022/23 – 16,794 samples were tested for PVY using PCR



ELISA



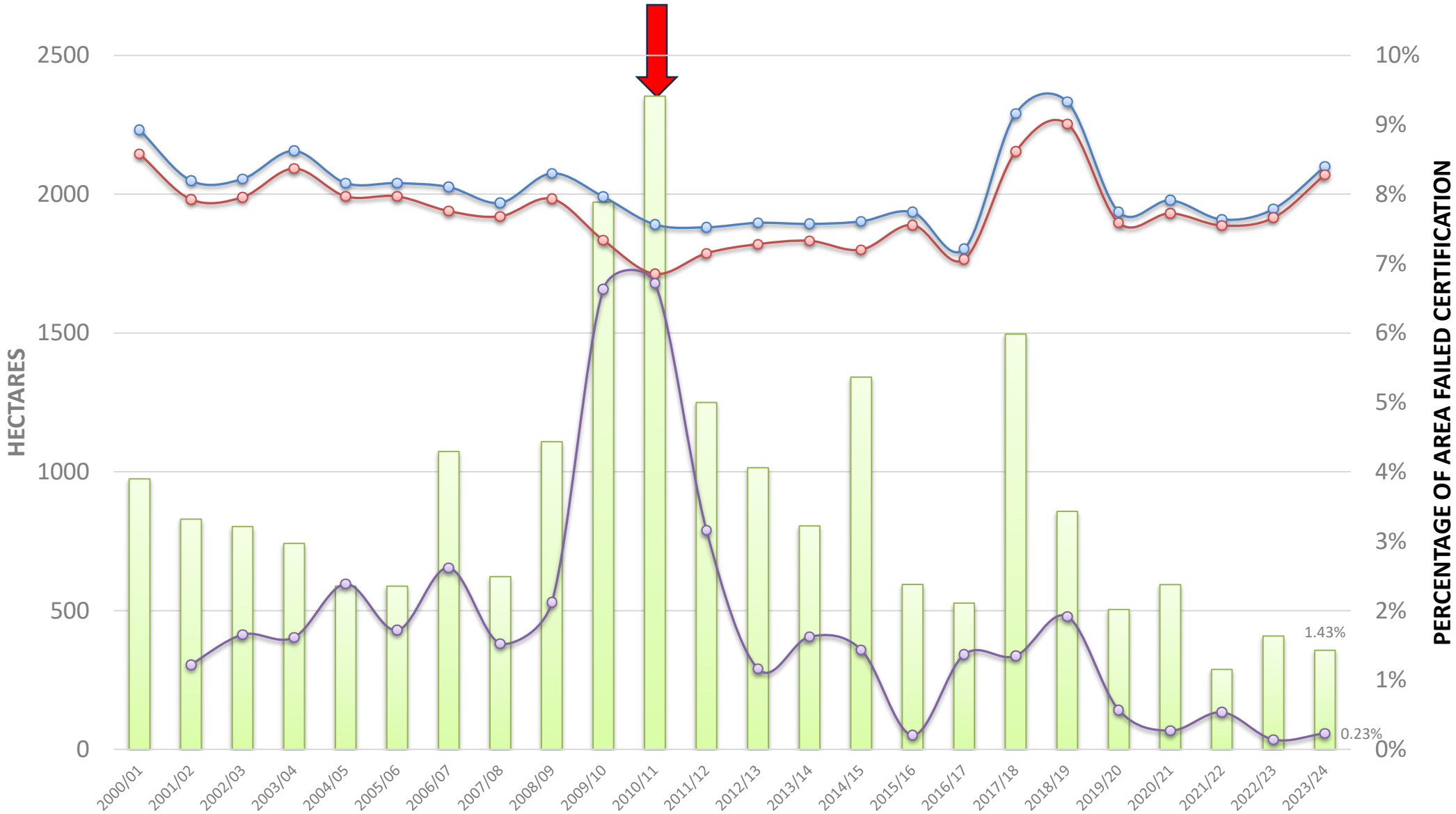
REAL TIME PCR

LATERAL FLOW KITS

PRACTICAL

Advance of technologies and their application

AuSPICA seed potato certification data 2000-2024



Potato facts

ViCSPA

vicspa@vicspa.org.au www.vicspa.org.au

Potato Virus Y

Potato Virus Y or more commonly called PVY is a serious disease of potatoes worldwide. The disease is caused by a virus which is transmitted by aphids and mechanical means. PVY has grown in importance in recent years due to the formation of new more aggressive strains of the virus. The disease can cause yield and quality loss in potato crops in the form of decreased yields, misshapen tubers or internal discoloration, resulting in thousands of dollars loss. **PVY has a significant impact on all sectors of potato production including seed, fresh processing**. However, the production and use of certified seed potatoes inspected to meet tolerances for PVY, provide the main line of defence for the management of this disease.

What is PVY of potatoes?

PVY is a viral disease of potatoes, tomatoes, tobacco and some weeds related to the family of the Solanaceous group of plants. The virus that causes PVY of potatoes belongs to the Potyvirus genus. Crop losses of 80-90% have been reported due to PVY, while additional losses in potato quality are observed (Figure 1). PVY can cause a range of symptoms including mottling and chlorosis (yellowing) of foliage; on tubers a necrotic ring can be observed and/or severe growth cracking making tubers unfit for sale/use.

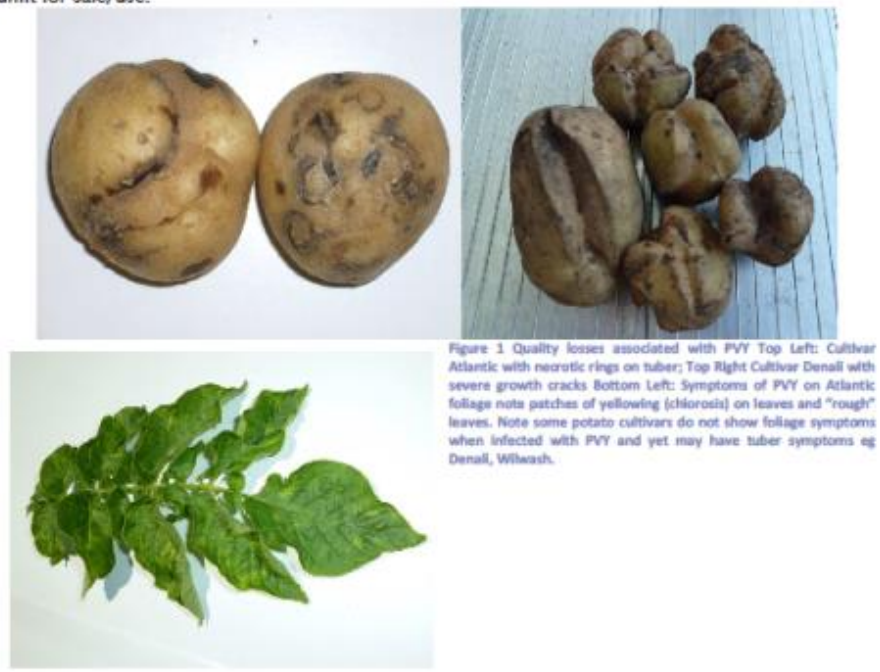
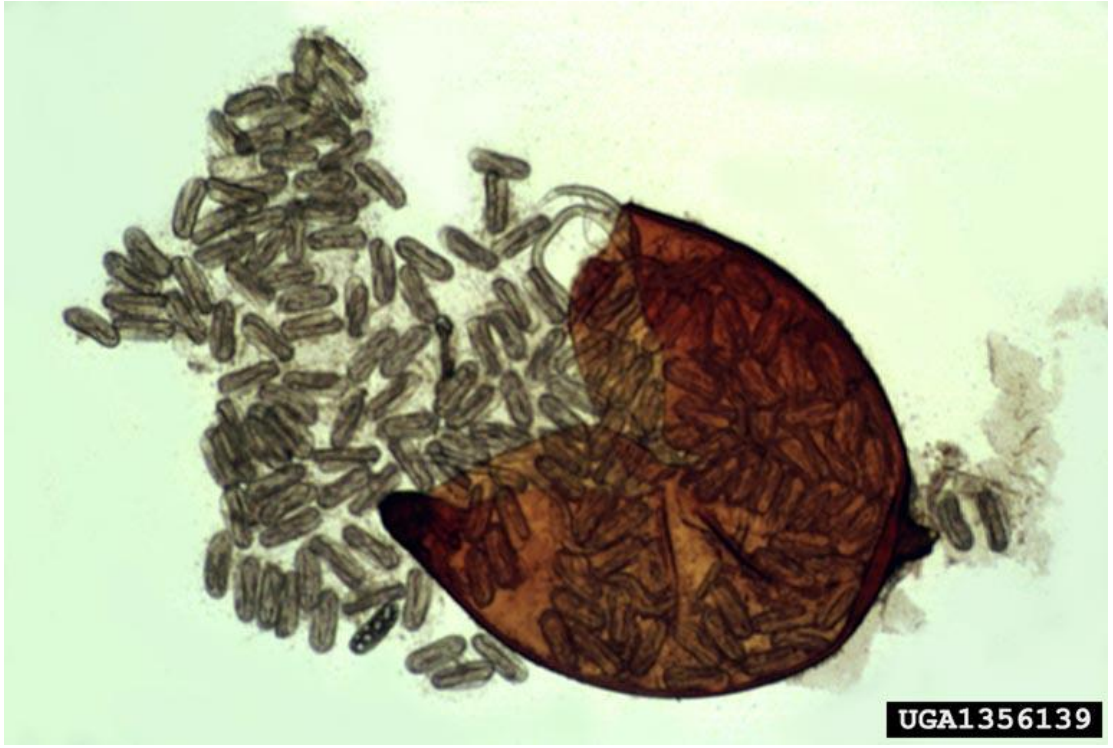


Figure 1 Quality losses associated with PVY Top Left: Cultivar Atlantic with necrotic rings on tuber; Top Right Cultivar Denali with severe growth cracks Bottom Left: Symptoms of PVY on Atlantic foliage note patches of yellowing (chlorosis) on leaves and "rough" leaves. Note some potato cultivars do not show foliage symptoms when infected with PVY and yet may have tuber symptoms eg Denali, Wilwash.

Potato Cyst Nematode (PCN)

- Quarantine and restricted pest
- Golden nematode
- Two species
  - ***Globodera rostochiensis***
  - *Globodera pallida*



Citation:
Ulrich Zunke, University of Hamburg, www.insectimages.org

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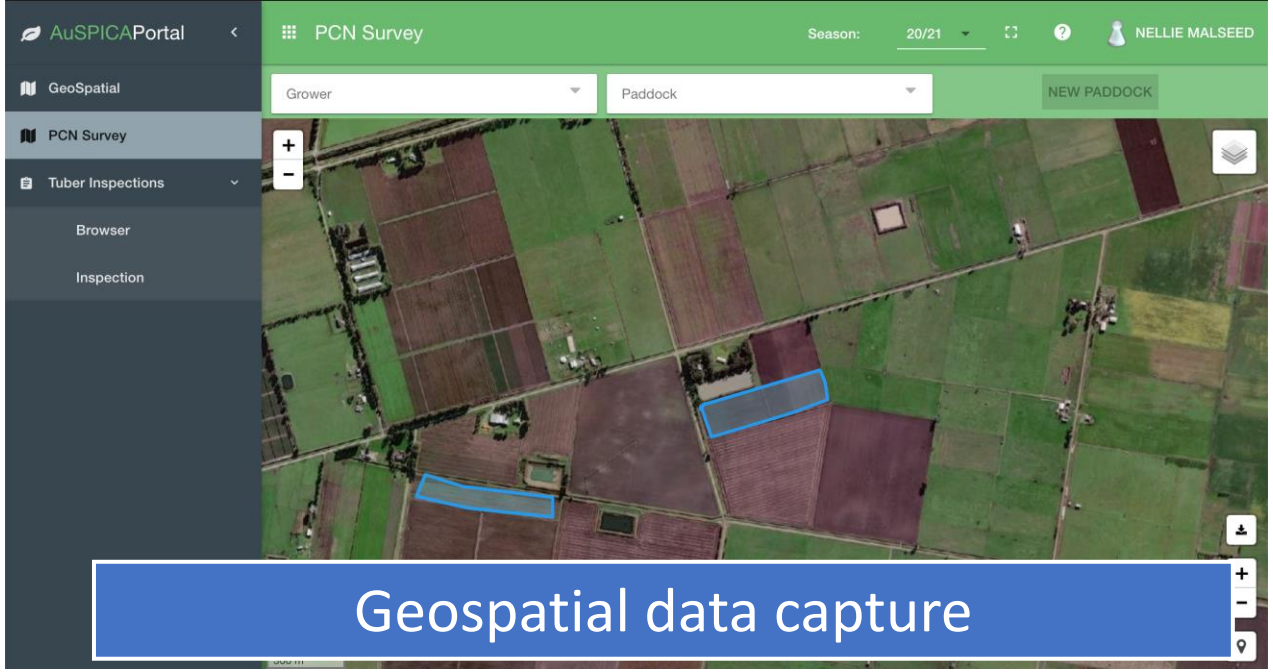
Pest free production of certified seed production based on evidence

Potato Cyst Nematode

Year	TOTAL Number of Ha Sampled
2022/23	2394
2021/22	2227
2020/21	2072
2019/20	2183
2018/19	2376
2017/18	2300



- Fenwick can extraction – microscope or PCR
- Both species *G. rostochiensis* and *G. pallida*
- No detections reported in fields used for certified seed potato production

- ✓ All fields are soil sampled **10 x 10 m grid**
- ✓ Soil test performed on **500g soil for every 2 ha**
- ✓ *MUST* be negative for certification
- ✓ **No seed farms with PCN infestations**

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Conclusions

- Emphasis on the importance of clean seed
- Continued effort maintains PVY at below economic thresholds
- Move from visual to more diagnostics – asymptomatic symptoms
- Data and evidence – education to growers
- Apply lessons learnt to other diseases

Exotic Potato diseases

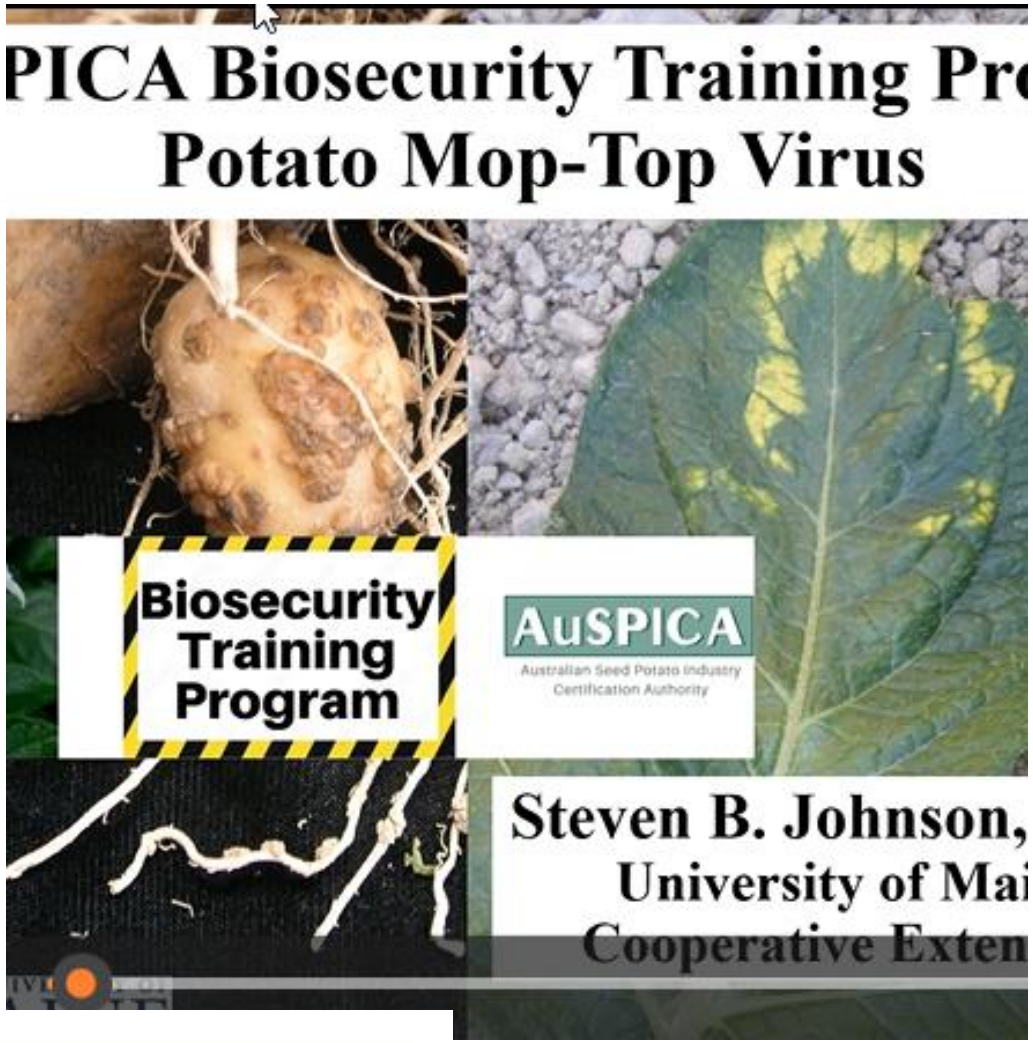
✓Prepared for new and emerging incursions

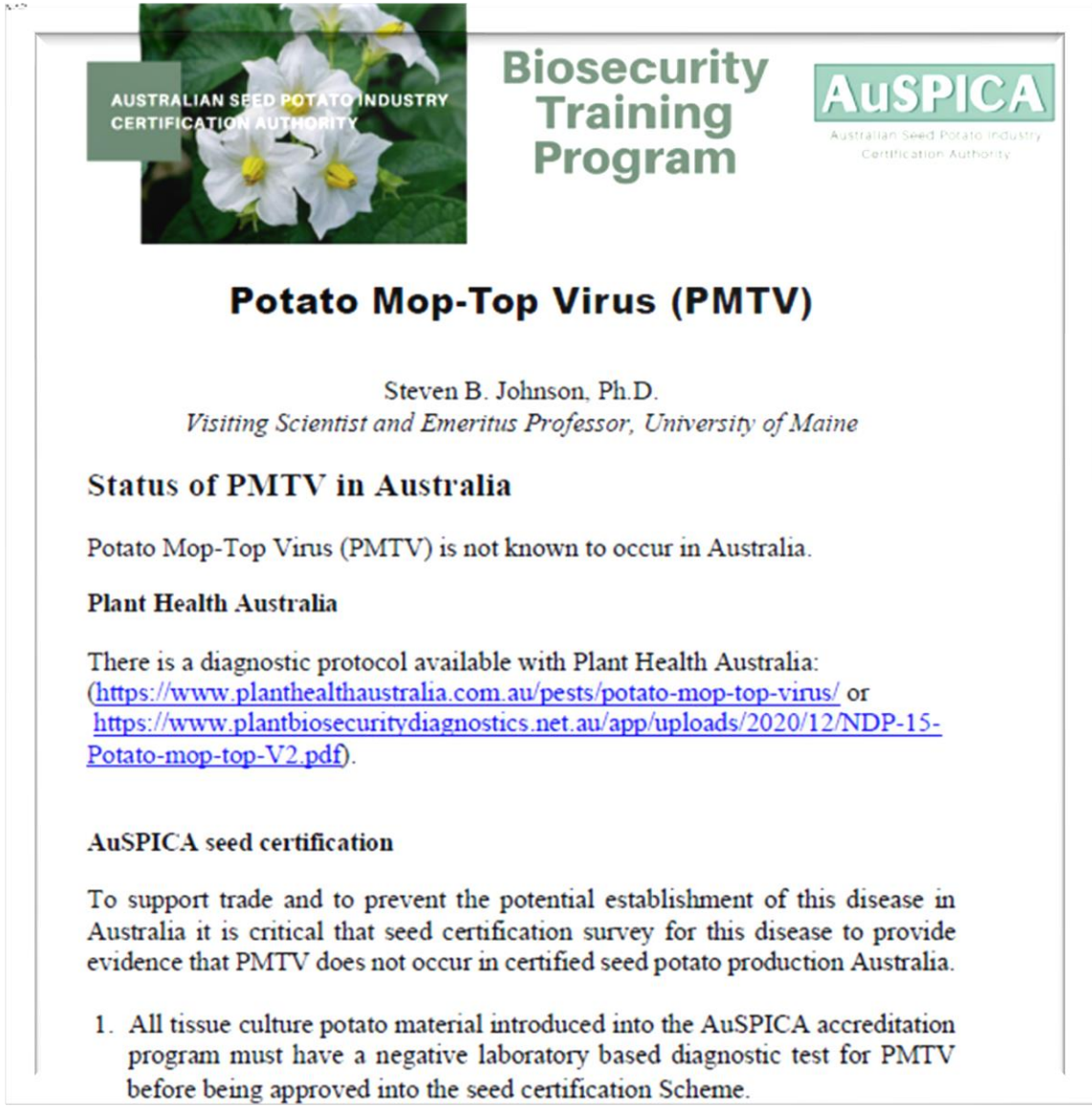
✓Collect data – area freedom

✓Support and facilitate trade export and domestic with known evidence that diseases are known not to occur

Disease / Pest	Pathogen
Potato Mop Top	Potato Mop top virus (PMTV)
Potato Wart	*Synchytrium endobioticum*
Ring Rot	*Clavibacter michiganensis* pv. *sepedonicus*
Zebra Chip	Candidatus Liberibacter solanacearum
Bacterial Wilt	*Ralstonia solanacearum*
Potato spindle tuber viroid (PSTVd)	Potato spindle tuber viroid (Pospiviroidae)
Potato Cyst Nematode (PCN)	*Globodera rostochiensis* and *G. pallida*
Blackleg	*Dickeya dianthicola*
Tobacco Rattle Virus	Tobacco rattle virus (Tobravirus; exotic strain)

TRAINING





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Seed Potato Certification - *Flattening the disease curve*

- High health seed - Management of disease - mitigate impacts on yield and quality
- Strengthen biosecurity data with ongoing active surveillance
- Support domestic and export markets – known status of many diseases
- Enhance sustainability and profitability of growers