Potato Cyst Nematode Management Policy for Victoria

Economic Development,
Jobs, Transport
and Resources

AGRICULTURE VICTORIA

CONTENTS

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1. AUTHORISATION

Title	Potato Cyst Nematode (*Globodera rostochiensis,* Wollenweber) Management Policy for Victoria
Issuing Division/ Branch	Chief Plant Health Officer (CPHO), Biosecurity Branch
Date Effective	August 2019
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2. INTRODUCTION

This document outlines the policy principles underpinning the management of Potato Cyst Nematode (PCN), *Globodera rostochiensis* (Wollenweber) in Victoria.

3. POLICY STATEMENT

Agriculture Victoria will, at state and national levels, support the establishment of collaborative risk-based management arrangements with affected parties (including state and commonwealth jurisdictions and industry groups). This support will minimise the potential impacts of potato cyst nematode (PCN) by encouraging solutions to sustain, restore or enhance productivity and market access.

Agriculture Victoria is the lead agency responsible for the delivery of plant biosecurity programs for PCN, including emergency response, containment, provision of area freedom, and certification of host material and equipment.

PCN is a declared notifiable pest under Section 17 of the Plant Biosecurity Act 2010, this legislation has been enacted to manage the pest in accordance with key elements of the Australian National Potato Cyst Nematode Management Plan (2012) (the Plan).

The Plan was developed by AusVeg on behalf of the Australian Potato Industry, as a basis for providing a consistent and technically feasible approach to the management of PCN nationally.

Consistent with the Plan, Victoria issues an area freedom certificate for PCN to facilitate trade and support containment efforts focussed on the management of land known to be infested with viable PCN or land linked to a known PCN infestation.

PCN containment efforts are focussed on the management of land based on its pest status, defined as:

- **PCN infested land**: any parcel of land with a known viable PCN infestation.
- **PCN linked land:** any parcel of land that has linkage with PCN infested land through proximity, the shared use of equipment, vehicles; or has received drainage water from an infested property; or was operated by someone also farming land that was reclassified as infested land; or was operated contrary to PCN permit conditions.
- **PCN un-infested land:** any parcel of land that is not classified as a linked land and with no-known PCN infestation; or any parcel of land that is not classified as a linked land and has no viable PCN eggs detected during the property reclassification process (see section 12. Reclassification of PCN affected land).

In Victoria, the level of PCN regulatory (movement and treatment) controls applied to a parcel of land will vary depending on the PCN pest status of that land. Refer section 10. Procedures for further information.

4. SCOPE

This policy has been developed to assist affected industries and government agencies with understanding the role of government and industry in PCN management in Victoria.

5. REQUIREMENTS

This policy statement identifies:

1. The risks and associated strategies used to manage PCN in Victoria.
2. The relevant legislation and technical standards that underpin PCN management in Victoria.

6. POTATO CYST NEMATODE BIOLOGY

PCN is considered to be the most significant nematode threat to potato production worldwide (Turner and Evans, 1998). PCN has the remarkable ability to survive many decades within soil in the absence of a suitable host and can cause major yield losses in susceptible potato varieties (Baldwin and Mundo-Ocampo 1991; Brodie et al., 1998).

The PCN lifecycle begins with immature nematodes or larvae that emerge from eggs contained within a cyst. Hatching is stimulated by chemicals leaking from potato roots (Ebrahimi et al., 2014; Renco, 2007). The juvenile nematode moves between soil particles to locate and invade potato roots. Once inside the root, the nematode punctures the plant cell and feeds with a needle like stylet. (Ebrahimi et al., 2014).

Feeding induces changes in the plant root cells which limits development and reduces yields. Female nematodes at feeding sites on the roots become sedentary and continually enlarge, rupturing the outer root tissue. Slender, male nematodes leave the roots and mate with the females. When the female dies, her body forms the resistant cyst that can contain between 200-600 eggs.

When the potato is harvested, the mature cysts drop off and remain dormant in the soil until further potato crops are planted. In general, only one life cycle occurs on each growing crop and takes from 38-48 days to complete. The mature cysts may also remain attached to harvested tubers in attached soil.

7. PCN RISKS

PCN is a soil-borne pest and is spread by transport of infested soil. PCN can move if:

- Host material (e.g. potato tubers or soil) is moved from an infested property to linked land or an un-infested property
- Used machinery is moved from an infested property to linked land or an un-infested property without appropriate cleaning.
- Growers do not apply appropriate on farm biosecurity protocols to restrict the entry of host material entering their properties.
- Growers do not look for and recognise PCN symptoms and report suspect infestations to Agriculture Victoria for investigation.

8. DETECTION MANAGEMENT

Responding to a new PCN detection is a government responsibility. The following is an agreed process for Agriculture Victoria's response to a new PCN detection:

1. Collection of a confirmatory sample from the affected paddock.
2. Laboratory diagnosis through an approved laboratory, including confirmation of genetic strain and egg viability.
3. Where the detection is confirmed positive for viable PCN:
    a. Enact legislation to reflect the changed land status of infested site and any identified linked properties.
    b. Inform landholder on the best-practice PCN risk management procedures and relevant regulations.
    c. Review any existing plant health accreditations to confirm ongoing ability of the business to comply with procedural requirements.

9. RISK MITIGATION

Industry Responsibilities

Implementation of PCN mitigation strategies to address both production and market access issues. PCN risk mitigation measures can include:

- Planting resistant potato cultivars in infested and linked land.
    - Sourcing only certified seed potatoes known to be PCN tested free.
- Ensuring machinery and used bins are cleaned free of soil prior to leaving or entering a property.
- Ensuring host crops are planted on long rotations (i.e. longer than 5 years) in linked land.
    - Alternatively, planting resistant crops on shorter rotations in infested land may help to reduce PCN populations.
- *Managing Solanaceous* weed and volunteer plants in the cropping area, headlands and fallow ground.
- Management of irrigation and run off water from infested land.

Government Responsibilities

Agriculture Victoria is responsible for implementing a rapid departmental response to new detections of PCN and consistent, transparent application of quarantine controls on infested, suspect infested and/or linked lands.

10. PROCEDURES

To provide industry groups with a cost-effective option for complying with PCN requirements, Agriculture Victoria provides Interstate Certification Assurance (ICA) accreditations and procedures to facilitate intra and interstate movement of PCN host material. Such programs are quality assurance-based programs, which acknowledge and formalise industry's role in achieving biosecurity outcomes.

The table below indicates protocols and procedures relevant to potato production.

Name of Protocol	Protocol application
ICA-44	Movement of potatoes (Processing and Ware) from PCN linked land
PS-14	Sourcing potatoes from a PCN Control Area
PS-27	Nursery Property Accreditation

11. PERMITS

Landowners are required to apply for permits to move host material off infested and linked land. Permit conditions have been developed for processing and ware potatoes, waste potatoes, ornamental nursery stock, used equipment, used packages and diagnostic samples. The movement conditions may not cover all circumstances, for these situations a special permit issued by Agriculture Victoria may be granted where the risk of spreading PCN can be adequately reduced.

12. RECLASSIFICATION OF PCN AFFECTED LAND

A nationally agreed survey strategy for PCN affected land reclassification is yet to be endorsed. Although the below information outlines the principles for reclassification, once national agreement is achieved.

PCN management can be achieved through successful implementation of best-practice risk mitigation measures. PCN reclassification is deemed to be successful if no viable PCN eggs can be detected during the reclassification processes.

To reclassify the PCN-related biosecurity land status of a property, a written application must be submitted to Agriculture Victoria by emailing market.access@agriculture.vic.gov.au. Prior to and during the reclassification process, the affected land must be managed under existing regulations.

Affected land reclassification will occur according to a nationally agreed survey strategy (yet to be endorsed). This strategy provides accepted standards to enable the declaration of the land as being no longer infested or linked to an infestation.

The table below indicates the general criteria for reclassifying PCN land status.

Current Land Status	Reclassified Land Status	Reclassification Criteria
PCN linked land; or PCN un-infested land	PCN infested land	Viable PCN eggs are detected on the property.
PCN infested land; or PCN un-infested land	PCN linked land	(1) No viable PCN eggs are detected during the reclassification process; **and** (2) There is a continued presence of linkage criteria to other PCN Infested Land(s) (e.g. neighbouring an infested paddock)
PCN infested land; or PCN linked land	PCN un-infested land	(3) No viable PCN eggs are detected during the reclassification process; **and** (4) All potential linkage criteria[1] to PCN Infested Land(s) have been actively managed

13. GLOSSARY/DEFINITIONS

Infested Land means any parcel of land with a known PCN infestation.

Linked Land means any parcel of land which has linkages to PCN infested land, this includes land that -

- was operated by a person who was also farming land that was reclassified as Infested Land; or
- was operated by a person contrary to PCN permit conditions; or
- has been previously farmed using equipment which has been used on Infested Land; or
- borders Infested Land; or
- receives drainage from Infested Land; or
- was planted with seed potatoes that were received from a parcel of land that has had a positive PCN detection within the previous 12 months.

The Department means Agriculture Victoria.

PCN means the pest Potato Cyst Nematode, *Globodera rostochiensis.*

PCN Control Area means an area declared by Order under the Act to be a Control Area for the purpose of preventing the spread of PCN.

PCN Un-infested Land means any parcel of land which is not classified as a Linked Land; and

- with no-known PCN infestation; or
- with no viable PCN eggs detected during reclassification process.

[1] This does not include new linkages that are managed in accordance with Agriculture Victoria permit conditions.

14. REFERENCES

Baldwin GJ, Mundo-Ocampo M. 1991. Heteroderinae, cyst-and non-cyst-forming nematodes. Pp. 275–362 *in* R. W. Nikle, ed. Manual of agricultural nematology. New York: Marcel Dekker.

Brodie BB, Evans K, Franco J. 1998. Nematode parasites of potato. Pp. 87–132 *in* K. Evans, D. L. Trudgill, and J. M. Webster, eds. Plant parasitic nematodes in temperate agriculture. Wallingford: CAB International.

Ebrahimi N, Viaene N, Demeulemeester K, Moens M. Observations on the life cycle of potato cyst nematodes, *Globodera rostochiensis* and *G. pallida*, on early potato cultivars. Nematology. 2014; 16:937–952.

Renčo M. Comparison of the life cycle of potato cyst nematode (*Globodera rostochiensis*) pathotype Ro1 on selected potato cultivars. Biologia. 2007; 62:195–200.

Turner SJ, Evans K. 1998. The origins, global distribution and biology of potato cyst nematodes (*Globodera rostochiensis* (Woll.) and *Globodera pallida* (Stone). Pp. 7–26 *in* R. Marks and B. Brodie, eds. Potato Cyst Nematodes. Biology, Distribution and Control. Cambridge, UK: University Press.

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Summary of amendments to latest version:

July 2019 - introduction of section 11 relating to permits, minor edits.

August 2019 – minor general review, inclusion of seed potatoes in linked land definition, change of wording from business/farmer to person in the linked land definition.