

Stopping the spread of potato diseases: an on-farm best practice guide

Many potato diseases are easily spread between fields on farm equipment. By improving farm hygiene practices growers can limit the impact of these diseases on yield, quality, and export access. This guide focuses on preventing the spread of potato cyst nematode (PCN) between fields. Many of the recommended practices will also prevent the spread of other pests and diseases of potatoes. This guide outlines the "best practice" for potato growers' on-farm hygiene - this is the standard which we hope all growers can aim to achieve through ongoing improvement.

Benefits of good farm hygiene

Potato cyst nematode and a wide range of other diseases including Verticillium wilt, violet root rot, common scab, and powdery scab



UGA1356053

PCN can dramatically reduce yield - the potato plant on the right is infected with the potato cyst nematode, while the plant on the left is not. Image courtesy of Christopher Hogger, Swiss Federal Research Station for Agroecology and Agriculture, Bugwood.org

can be spread when soil is moved from one farm to another. PCN can severely reduce potato yields and affects export market access, and once it becomes established on a piece of land it is very difficult to remove. Only a few chemical control options are available, and PCN can survive in the soil for up to 18 years. Other diseases can also have huge impacts - farm hygiene is essential to maintain productive land.

Chief risks

The chief risks for spreading PCN are:

- seed tubers, particularly saved seed from uncertified crops,
- soil on machinery, boots, vehicles etc, and
- waste from table potatoes such as reject tubers, water from washing, and soil.

Key issues

- Potato cyst nematode and other pests and diseases can be spread on seed tubers, in soil associated with boots, machinery etc, and in waste from table potatoes.
- Once PCN is in the soil it is almost impossible to remove.
- Only certified seed tubers should be grown.
- Machinery and vehicles should be washed before they are moved to a different farm.
- Contractors and their vehicles may pose a significant contamination risk.

Managing these risks

Seed potatoes

Seed potatoes have the potential to carry PCN and introduce it into a new area. All certified seed potato crops grown in New Zealand are surveyed for PCN so the risk posed by certified seed potatoes is minimal. Seed from unsurveyed crops can pose a serious risk, however, so commercial growers should only grow from certified seed potatoes.

Soil movement

The movement of soil is a common way of spreading PCN - even a small amount of soil is enough to spread PCN, so movement must be restricted as much as possible. Machinery, bins

and containers, or anything else which is used in the field, can easily pick up soil which can be dislodged the next time the machinery is used. If the soil is infested with PCN then this will lead to a new area becoming contaminated. High pressure washing is the best way to remove soil and the potato cyst nematode, and avoid spread.

Table potato waste

Waste from table potatoes such as reject tubers, water from washing, and soil can all carry PCN. Feeding out reject tubers or spreading this waste onto fields can lead to new infestations so should be avoided. Potato washing water should be filtered or ponded with the settled sludge disposed of in a landfill.



PCN cysts on a potato plant's roots. Image courtesy of Jonathan D. Eisenback, Virginia Polytechnic Institute and State University, Bugwood.org

High pressure washing to prevent soil movement

It is essential to clean equipment and bins when moved between farms because it is often difficult to be certain whether the other farm's soil is clear of pests and diseases. If a bin has been sourced from another property

such as for carrying seed, or piece of machinery has been used on another farm it should ideally be cleaned at that site before being transported to another location.

When moving equipment between fields within a farm it is good practice to clean the equipment. This is particularly important if new land is being used to grow potatoes for the first time.

How to clean machinery, vehicles, and bins

All farms or blocks of land used for potato growing should have a specific area which is used for the washing down of machinery. This area should be large enough for vehicles to turn, the ground should be paved, gravel, or well grassed, and the water from washing should not run off into fields. If possible, cleaning should be done when the area isn't wet or muddy.

A short checklist is a helpful way of identifying what needs to be cleaned on each piece of machinery. Tires, wheel wells, and any parts of the machinery which are in contact with the ground are the most important and obvious areas, but the checklist should also include any out of the way or hidden areas.

It may be difficult to access some parts of a piece of machinery which will make it difficult to clean effectively or regularly. For these a cleaning priority can be developed:

- Always clean after using at a site known to be infested with PCN.
- Clean as is practical (weekly / monthly)

- after using at sites not infested with PCN.
- Always clean at the end of the season.

The washing procedure for machinery and vehicles is as follows:

- Dislodge any large clods of soil from the machinery before leaving the field.
- Drive the machinery directly to the washing area, avoiding other fields if at all possible.
- Wash with a high-pressure hose or water blaster if there is no known risk of PCN in the soil.
- Wash comprehensively and steam clean if the equipment has been used in a field which is known to be infested with PCN.
- Follow a checklist for each piece of machinery to ensure every part has been cleaned.

Growers should remember that farm machinery as well as any equipment, bins, tools, boots, or containers that are in contact with soil can spread PCN and other soil-borne diseases. Simple procedures will keep PCN out of a field, but if it is introduced into a field it is almost impossible to eradicate.



Washing machinery, vehicles, and bins with a high pressure hose or water blaster is one of the most effective ways of preventing PCN's spread.

Other risks

Contractors

Contractors (and other visitors) may visit a number of farms in quick succession so their vehicles can easily spread infested soil. When the same tools and machinery are used at a number of farms this can pose a significant risk. It is important to make sure that contractors are aware of the risks they pose and that they appreciate that good farm hygiene is essential to maintain productivity. An information card "Farm hygiene: recommendations for contractors" is available from Potatoes NZ. It is recommended that growers ensure all contractors have read this information card and follow these recommendations.



Boots can easily carry soil from farm to farm, so it is important to clean boots when leaving a farm or block of land.

Boots

When leaving a farm or block of land any clods of soil should be removed from boots, and boots should be washed in detergent then soaked in sodium hypochlorite if possible.

Other vehicles

Soil is easily picked up by vehicles driving through farms. As well as this, when crops are transported soil can be dropped onto roads and then picked up on the tires of passing vehicles. This soil can then contaminate other farms. Try to minimise the number of vehicles which enter your fields and be particularly wary of vehicles which have visited other properties which may be infested with PCN or other diseases (such as the vehicles of merchants, agronomists, or contractors).

Grazing animals

Animals grazing on pasture can pick up and transport soil and plant material, which can be particularly concerning when reject potatoes are used as stock food. Growers should be aware of this risk when choosing stock feed and when livestock are moved between fields.

Leased land

Farm hygiene is particularly important when land is leased as records may not be available of the previous crop history. Get as much information as possible on the history of the land, particularly regarding potato cultivation, whether potatoes have been fed out on the block, and the results of any PCN testing.

Front page header image courtesy of Bonsak Hammeraas, Bioforsk - Norwegian Institute for Agricultural and Environmental Research, Bugwood.org

Potatoes New Zealand

www.potatoesnz.co.nz
Ron Gall (Business Manager)
Horticulture New Zealand
PO Box 10 232
Wellington

Phone 04 472 3795
Fax 04 471 2861
Mobile 027 446 6838
Email ron.gall@hortnz.co.nz