SASA
Helping Scotland Grow

Scottish Government
Riaghaltas na h-Alba

SOIL TESTING
FOR
POTATO CYST NEMATODE

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1. APPLICATION FOR SOIL TESTS

An application form is available from SASA's website, www.sasa.gov.uk, SPCS Administration or your local SG ARE Area Office (Directorate for Agriculture and Rural Economy). Contact details are in section 14. You are also welcome to make photocopies should you require additional forms.

If a field requires a PCN test, **applications for soil sampling should be received at SASA no later than 31 August of the preceding year.** The results for all applications received before then will be issued in time for spring planting. We aim to issue the results of 95% of all applications received prior to 31 August by 31 December. The results for applications received later than 31 August cannot be guaranteed in time for planting.

Applications should be submitted as early as possible, to enable both inspectors and SASA to manage the workload and to allow for sampling visits to be arranged around the production of other crops in the field

The application form can be submitted by e-mail to SPCSApp@sasa.gov.scot Please enter PCN in the subject box.

Queries about soil sampling for **non-potato crops, plants and plant products** should be directed to the Scottish Government Horticulture and Marketing Unit, email hort.marketing@gov.scot

PLEASE DO NOT COMPLETE THE APPLICATION FORM UNTIL YOU HAVE READ THIS LEAFLET AND THE NOTES FOR COMPLETION

2. PCN - BACKGROUND

PCN can cause significant loss of yield in potato crops. They multiply rapidly when potatoes and other host plants are grown, and persist in the soil for many years. Controls are in place in most potato-producing countries to limit the increase and spread of PCN.

Scotland currently has a low incidence of PCN, and is free of other quarantine diseases of potato. This allows us to produce classified seed potatoes of high health status for the ware industry in Scotland and other parts of the UK, and for export. Preventing the spread of PCN is essential to maintain the supply of land suitable for potato production, both seed and ware.

There are two species of PCN, *G. rostochiensis* and *G. pallida*, with some differences between them which affect how they can be controlled. *G. rostochiensis* was previously dominant in all parts of the UK, but *G. pallida* is now dominant in England and increasing in Scotland.

The main route by which PCN spreads is through the movement of infested tubers and in soil which may be transferred on plants, waste material or farm machinery. There is also a risk of contamination through washing water. The higher the population of PCN in a field the greater the risk of spreading it to other land.

PCN populations decline naturally in the absence of host plants, so long rotation periods are an effective control method. Resistant varieties can also be used to control the pest, but their uptake depends on these varieties being desirable to the market. Other measures such as nematicides and trap crops may also be part of a control programme, but none will eradicate PCN without long rotations.

Farmers who grow potatoes, or who rent out their land for potato production, should be aware at all times of the risks of soil-borne pests and diseases and should take care in bringing soil or material that may have soil attached onto their land, or moving it around.

3. CROPS REQUIRING PCN TESTING

Classified Seed Potatoes

It is a requirement of the Seed Potato Classification Scheme (SPCS) that all crops entered for inspection **must** be grown on land for which a PCN clearance certificate is in force at the time of planting, issued by SASA. **Potatoes planted before a certificate of clearance has been received will not be eligible for inspection.**

Farm saved seed

In Scotland it is not permitted to plant any potatoes except classified seed potatoes or one year's direct progeny of them. That progeny is described in this leaflet as farm saved seed. Farm saved seed may not be sold or transferred to any other person, but may be planted by the grower for ware production.

The Plant Health (Official Controls and Miscellaneous Provisions)(Scotland) Regulations 2019 recognises that all movement of seed potatoes poses risks of spreading PCN, and therefore the new system applies to farm saved seed as well as to classified seed.

All potatoes intended for replanting as farm saved seed must be produced on land for which a PCN clearance certificate issued by SASA is in force at the time of planting, unless they are to be replanted on the same holding where they were produced. Holdings will be identified by farm code. Where units have been amalgamated, land will only be considered to be "on the same holding" if it is in the same parish, or contiguous across a parish boundary.

The origin of farm saved seed may be checked at any time, for example during ware inspections, using information from PP1 forms and other sources. If crops are found which contravene the PCN testing requirements, action will be taken to minimise the risk of spread, which may include destruction of the crop, and the grower may be prosecuted. For example, if a farmer moves farm saved seed (FSS) from a crop (crop A) grown in untested land from one holding to plant in another holding for ware production as crop B, this is a contravention of the regulations. The consequence is that the field used to grow the FSS (crop A) will be tested at the rate that should have applied prior to planting. If the field fails the test, both the field used for crop A and the field growing crop B will be recorded as infested. A control programme must be established for the suppression of PCN for both of the fields. If the field used to grow crop A is clear, no further action will be taken. The grower of the crop pays for the PCN testing.

In all cases, testing must be carried out prior to planting.

Ware potatoes

There is no requirement to test land before planting a crop of ware potatoes, where none of the crop will be retained as farm saved seed for further planting.

Potatoes for Export

Export countries may have additional requirements for PCN freedom, for both seed and ware potatoes. Please see section 12 for details.

Potatoes grown on rented land

If you intend to plant potatoes on rented land for inspection within the SPCS or for farm saved seed, it is your responsibility to ensure that the relevant valid clearance certificate is in place. If you have not arranged for PCN testing yourself you should ask the owner for sight of the certificate before planting.

If you plant any potatoes, including ware, on rented land it is your responsibility to check before planting that there are no restrictions on the land due to findings of PCN or any other pest or disease. The owner of the land should have this information; SPCS Administration or the local Area Office can also confirm the status of the land.

Non-Potato Crops

Restrictions to control PCN also apply to some other vegetable and fruit crops and flower bulbs, if grown in soil for replanting. Details of these are provided in Annex A.

4. ELIGIBILITY FOR SPCS

Growers wishing to enter crops into the SPCS should be aware that land is not eligible for planting until the required rotation gap has elapsed since the planting of the previous potato crop. These rotation gaps are:

Pre-basic (PB) – the land on which seed potatoes are to be planted must not have grown a potato crop during the preceding 7 years.

Basic (S/SE/E) – the land on which seed potatoes are to be planted, must not have grown a potato crop during the preceding 5 years.

Approved stocks – must comply with the above requirements, as appropriate.

Clearance certificates for completed tests are valid for up to 4 subsequent seasons. Please use the following table to check that the result of your soil test will be valid for the year in which you plan to plant potatoes for entry into the SPCS. If you are unsure about validity please contact SPCS Administration.

Year last planted	Earliest date eligible for planting	
	S/SE/E	Pre-basic
2016	2022	2024
2017	2023	2025
2018	2024	2026
2019	2025	2027
2020	2026	2028

5. FEES

The fee is £13.81 (subject to review) for each 400ml of soil to be tested.

Section 6 explains how much soil is required in different circumstances, and includes a ready reckoner for fees.

After an application has been received and checked, an acknowledgement will be issued to the applicant by SPCS Administration to confirm that it is valid. The acknowledgement will also confirm the fees to be charged. An invoice will be sent to the applicant after the results have been issued. **Please do not send payment until you receive the invoice,** unless requested by SASA.

6. SAMPLING RATES AND SAMPLED UNITS (PART FIELDS)

The amount of soil to be taken from each field depends on its history and how it is divided into “sampled units”. Since the fee is based on the amount of soil tested, lower sampling rates will be reflected in lower fees for the applicant.

History of the land

There are two soil sampling rates:

The **standard rate** is 1500ml/ha.

The **lower rate** is 400ml/ha.

All derecording (descheduling) tests will be carried out at the standard rate.

Other sampled units are eligible for the lower rate if:

a. No potatoes have been grown there for 6 years prior to planting (7 year rotation); or

b. No PCN have been found in the previous 2 official tests; or

c. No PCN or dead cysts were found in the most recent official test based on visual examination.

(b) and (c) will not apply if any potatoes have been planted in the land other than those for which a clearance certificate was in place following an official test, over these respective periods. The unit will be sampled at the standard rate if <u>any part</u> of the unit fails to qualify for the lower rate.

Soil samples will be routinely analysed by a “PCR” method, which identifies any PCN DNA in the sample, but does not identify dead cysts.

<u>Size of sampled Units</u>

Both the standard and lower rates of sampling can be further reduced where land is tested in larger areas, as follows:

- For the **standard rate**, 1500ml/ha reduced to 400ml/ha after the first **8ha**;
- For the **lower rate**, 400ml/ha reduced to 200ml/ha after the first **4ha**.

Where this applies, the average sampling rate for the area will be calculated and rounded to a whole number of 400ml samples, as in the following example, so that inspectors can take soil at the average rate across the whole sampled unit:

11ha at lower rate	**11ha at standard rate**
4ha @ 400ml = 1,600ml	8ha @1500ml = 12,000ml
7ha @ 200ml = 1,400ml	3ha @ 400ml = 1,200ml
Total soil required = 3,000ml	Total soil required = 13,200ml
Rounded up to full samples = **3,200ml** (8 samples)	Rounded up to full samples = **13,200ml** (33 samples)
(average sampling rate = 290ml/ha)	(average sampling rate = 1,200ml/ha)

The whole field can be tested as one unit, or applicants can choose the number and size of units into which fields will be divided, subject to a few restrictions set out below.

These units will be described as “sampled units”. Several samples of soil will be collected from each sampled unit, but these will be amalgamated to provide a single result. This single result for the sampled unit will be issued and, **if PCN are found, the whole sampled unit will be recorded as infested and subject to restrictions**.

- In general, sampled units should not be smaller than 4ha. Fields smaller than 4ha should not be divided;
- Sampled units must have fixed boundaries on at least two opposite sides, and the direction of drilling must be from one of these to the other;
- If you wish to divide a field into the maximum number of units, these should be 4ha each plus a "remainder";
- If the "remainder" is 2ha or larger it can be treated as a sampled unit on its own;
- If the "remainder" is less than 2ha it should be combined with the neighbouring 4ha unit.;
- Inspectors may adjust the division of a field, for practical reasons. This will be done in consultation with the applicant;

- Areas clearly unsuitable for potato production will not be sampled. It is also permitted for the applicant to designate areas within the field which are not to be sampled. These areas must either:
  - reach across the whole field from one boundary to the opposite one, in line with the direction of drilling in the neighbouring sampled units; or
  - be surrounded by a strained 3 wire fence from before the date of sampling which will remain in place until after the date of harvest.
- Where exclusions are used the splitting restrictions above apply to the remaining field area.
- Where a field contains land recorded as infested and is to be divided in such a way that the land recorded as infested is present in more than one of the resulting sampled units, each of these units will be treated as though the whole unit is infested

The sketch map on the application form must show the nature of recognisable boundaries and the direction of drilling. If a field is to be divided into different sampled units, or any areas are to be excluded, this must be clearly shown and the size (in hectares) of each sampled unit and excluded area should be indicated. Several worked examples showing different field divisions and the associated fees are provided with the application form "Notes for Completion".

Maximum number of sampled units for different sizes of field

Field size (ha)	Maximum number of sampled units
1	1
2	1
3	1
4	1
5	1
6	2
7	2
8	2
9	2
10	3

Field size (ha)	Maximum number of sampled units
11	3
12	3
13	3
14	4
15	4
16	4
17	4
18	5
19	5
20	5

Size of sampled unit and fees

Size of unit (ha)	Lower rate		Standard rate	
	Total soil required (ml)	Fee	Total soil required (ml)	Fee
1	400	£13.81	1600	£55.24
2	800	£27.62	3200	£110.48
3	1200	£41.43	4400	£151.91
4	1600	£55.24	6000	£207.15
5	2000	£69.05	7600	£262.39
6	2000	£69.05	9200	£317.63
7	2400	£82.86	10400	£359.06
8	2400	£82.86	12000	£414.30
9	2800	£96.67	12400	£428.11
10	2800	£96.67	12800	£441.92
11	3200	£110.48	13200	£455.73
12	3200	£110.48	13600	£469.54
13	3600	£124.29	14000	£483.35
14	3600	£124.29	14400	£497.16
15	4000	£138.10	14800	£510.97
16	4000	£138.10	15200	£524.78
17	4400	£151.91	15600	£538.59
18	4400	£151.91	16000	£552.40
19	4800	£165.72	16400	£566.21
20	4800	£165.72	16800	£580.02

7. RESULTS OF SOIL TESTS

Soil sample free from PCN

If the soil sample is free from PCN DNA equating to the presence of a live cyst, a certificate of clearance will be issued which will remain in force for four planting years, i.e. 2022 up to 2025, or until potatoes are planted in the land, whichever is earlier.

If PCN are detected during additional PCN soil testing for export purposes (e.g. for Israel), for other crops listed in Annex A or for other reasons, the certificate of clearance for planting of seed potato crops will be withdrawn.

Soil sample containing PCN

If PCN DNA is found in an official soil sample, the sampled unit will be recorded as infested. No seed potatoes may be grown in the land either for inspection within the SPCS or for farm saved seed. Ware potatoes may be grown, but only if an Official Control Programme is in place, see below.

In light of the more intensive sampling of the new system, these restrictions will apply only to the sampled unit in which live PCN material has been found. There will be no restrictions on adjoining land or on sampled units where only dead cysts have been found.

A Statutory Notice under the Plant Health (Official Controls and Miscellaneous Provisions)(Scotland) Regulations 2019 will be issued to the applicant explaining the planting restrictions. The applicant will be provided with a result showing the species and estimated amount of PCN found.

No further application for a PCN test on the same land will be accepted for at least 6 years (see section 9).

Official Control Programme

Ware potatoes may be grown on land which is recorded as infested only if an Official Control Programme has been agreed with SG ARE in order to suppress PCN and minimise the risk of spreading the pest. A control programme may include the use of long rotations, resistant varieties and other measures such as nematicides, to reduce the population of PCN over time.

Guidance on control programmes is available on the SASA website and will be provided to both the applicant and the landowner (where different) with the result of any test in which live PCN have been found.

8. LAND SCHEDULED PRIOR TO 2010

All land which was scheduled prior to the introduction of the new system for soil sampling in 2010 will remain subject to restrictions under the new system until completion of a satisfactory derecording test (see 9).

All licences issued to allow the planting of potatoes of a resistant variety for ware production, expired on 31 December 2010.

Anyone wanting to grow ware potatoes in land recorded as infested (scheduled) will now need to agree an official control programme with SG ARE.

9. DERECORDING

The restrictions imposed on land which has been found infested with PCN can only be lifted after an official soil test has been completed and found free from live cysts. The requirements for derecording are:

- An application for a derecording test will not be accepted until a minimum of 6 years has elapsed since the last official soil test which found PCN, or the last potato crop grown in that field.
- All derecording tests will be carried out at the standard rate of 1500ml/ha (reduced for larger fields as appropriate). Therefore the chances of detecting PCN are much greater and it is advisable to allow the PCN population greater time to decline, unless other control measures have been deployed.
- If the test is found clear of PCN, the recording notice will be revoked and no further restrictions will apply to the field. Potatoes may be grown for ware, farm saved seed or classified seed.

10. WARE SURVEY

The Scottish Government carries out an annual PCN survey of at least 0.5% of all land on which ware potatoes have been grown in each year. Fields are selected at random, to ensure a representative picture of PCN distribution across Scotland, and a 4ha area of each selected field will be sampled, at a rate of 400ml/ha. These samples will be analysed as for pre-planting tests, to identify the quantity of each species found. There is no charge for this testing.

Fields for the survey are selected in late summer and sampled in the following February/March.

If PCN is found as a result of testing for the ware survey, the sampled unit will be recorded as infested and will be subject to the restrictions set out in section 7. However, even if the sample is free of PCN this testing will **not** result in the issue of a clearance certificate for production of seed potatoes nor for a phytosanitary certificate for export.

11. MOVEMENTS OF BULK SOIL

Clearance remains in place for the period specified on the certificate or until potatoes are planted in the land, whichever is the earlier. If, however, within the period, the land is affected by major soil moving operations, e.g. pipe-laying, road works, etc., SASA should be informed, as further testing may be necessary.

Care should be taken to ensure that any bulk soil brought on to the farm for infill is not infested with PCN; occupiers are recommended to check that contractors have had the proposed infill tested.

12. EXPORTS – PHYTOSANITARY CERTIFICATES

Potatoes to be exported must be certified as complying with the plant health requirements of the importing country. Phytosanitary certificates are issued by the local Area Offices.

For most importing countries, the PCN soil testing regime set out in these notes is sufficient. However, some countries have special requirements regarding the absence of PCN from the area in which a crop for export is to be grown, or may stipulate a test of soil from tubers of the lot prepared for marketing.

Additional export testing requirements for seed potatoes are in place for the following countries:

Bangladesh, Pakistan: Pre-planting field soil test, no PCN found within specified distance in previous 12 months.

Israel: Pre-planting field soil test with a time requirement (10 months).

Kenya, Tanzania: Field soil test with a time requirement (12 months).

Brazil, Cuba, Indonesia, Jordan, Kazakhstan, Malawi, Nigeria, Pakistan, Syria, Uruguay: Consignment test

In some cases, there are also requirements for ware crops to be tested for PCN, either with a consignment test or a field soil test. Please ensure you are aware of the requirements of the importing country before planting your crop.

Details of the PCN requirements for individual importing countries, for both seed and ware, can be found on the Scottish Government Potato Export website at: http://www.gov.scot/potatoexports

Fields with any history of PCN should be avoided when considering planting locations for crops intended for export to any of the countries mentioned above even where the land has a certificate of clearance for seed potato production.

Israel

Israel requires that PCN soil samples for seed potato exports must be taken from the field in which the crop for export is grown no more than 10 months prior to planting. If you intend planting a seed crop for export to Israel in a field for which the clearance certificate was issued more than 10 months before planting, please apply for a new pre-planting test.

The results of this test will be treated as those of a standard PCN test (see section 7). If the land passes the test, the previous certificate of clearance will be withdrawn and replaced with a new certificate of clearance.

If a seed crop is to be exported to Israel but not grown in a field for which a pre-planting soil test was carried out within 10 months prior to planting, a field soil test is allowed during crop growth or after harvest. In case of a positive PCN finding, the crop will not be eligible for seed and land will be recorded as infested. There will be a charge for the test see the link to the SG Export Section at Section at 13 below.

Consignment tests

Soil is the main method by which PCN cysts are carried on tubers. It is essential that consignments for export contain as little soil as possible in order to minimise the risk of rejection by the plant health authority of the importing country. As indicated above, several importing countries require soil or other loose material contained within inspected bags to be tested for PCN (consignment test) in addition to a field soil test.

The charge for a PCN consignment test is £30.50.

The following action will be taken depending on what is found in the consignment test:

- If no live cysts are found in the sample, or if the consignment is found to be totally free from soil and no sample can be collected, the lot may be exported.
- If the sample is found positive for PCN, the lot concerned will be designated as infested. It will be failed for export and as seed and may only be sold as ware on the home market. Such lots **must not be planted** for ware production, and should not be used as animal feed except on farms out with potato production areas.
- Subsequent lots from a crop with a previous consignment test failure will not automatically be failed. Each subsequent lot will, however, be subject to a further consignment test. If no live cysts are found in the soil sample the lot may be marketed as seed.

Enquiries about exports and non-EU country requirements should be directed to your local Area Office or to the SPCS & Export manager, tel. 07824 499332, e-mail: potatoexports@sasa.gov.scot

13. EXPORT OF WARE POTATOES

Guidance on the arrangements for testing land or potatoes to meet particular export destination requirements (e.g. Egypt) can be found on the Potato Export section of the Scottish Government web site at - http://www.gov.scot/Topics/farmingrural/Agriculture/plant/18273/potatoexpconds/PCNfieldware.

14. CONTACT DETAILS

Enquiries about soil sampling for PCN can be directed to SPCS, contact details are shown below, or to your local Area Office.

e-mail	Telephone
spcs@sasa.gov.scot	07901 698970
	07433 239524

Details of Area Offices are available on the Scottish Government website at https://www.ruralpayments.org/publicsite/futures/topics/contact-us/
Further information about the Seed Potato Classification Scheme can be obtained by using this link: http://www.sasa.gov.uk/seed-ware-potatoes

15. COMPLAINTS AND COMMENTS

If you have a complaint about the service we provide in relation to the Seed Potato Classification Scheme, you should proceed as follows:-

First get in touch with the person dealing with the application concerned. You can register a complaint by letter (including email), by telephone or in person. It will help us to investigate your request/complaint if you set out the facts as fully as possible. We will acknowledge your complaint by return, investigate it properly, and aim to reply within 2 weeks.

If your complaint relates to the actions of Area Office staff and you want it to be considered initially by a more senior officer, please write to the Principal Agricultural Officer at the relevant Area Office.

If for any reason you remain dissatisfied then please write to Chief Agricultural Officer, The Scottish Government, Directorate for Agriculture and Rural Economy, Saughton House, Broomhouse Drive, Edinburgh, EH11 3XD.

If your complaint relates to the actions of temporary members of staff and you remain dissatisfied after writing to the Principal Agricultural Officer then please write to Gerry Saddler, Head of SASA, Roddinglaw Road, Edinburgh, EH12 9FJ.

Alternatively, **if your complaint is about the handling of your application, fees, test results or the rules covering the SPCS**, please write to the SPCS Manager at SASA, Roddinglaw Road, Edinburgh, EH12 9FJ.

If for any reason you remain dissatisfied then please write to the Head of Potato Section, at SASA, Roddinglaw Road, Edinburgh, EH12 9FJ.

If you have used the complaints procedure set out above and are still not satisfied, you may ask the Scottish Public Sector Ombudsman to consider your complaint. Your complaint must usually be submitted to the Scottish Public Sector Ombudsman, 4 Melville Street, Edinburgh, EH3 7NS, within 12 months after the day on which you first had notice of the matter which you are complaining about. Further information is available at www.spso.org.uk. The telephone number is 0800 377 7330.

Comments

On the other hand, if you are satisfied with the service we have provided, or wish to highlight some particular performance, we would be happy to hear from you. Should you have suggestions about how we can improve the service we provide, these will also be welcomed.

ANNEX A

OTHER PLANTS SUBJECT TO CONTROLS

In addition to potatoes, some restrictions apply to the production of propagating material of other plants which are either hosts of PCN or are likely to be grown in rotation with potatoes and have the potential to spread the pest. **These controls apply only to plants grown in soil intended for transplanting with roots or soil attached.** As these plants are usually grown in Scotland from true seed and planted in soil-free composts, these restrictions are rarely expected to apply.

The affected species are organised in categories as follows:

A. Host plants

Capsicum spp. (Sweet peppers and chillies)
Lycopersicon lycopersicum (L.) Karsten ex Farw. (Tomato)
Solanum melongena (L.) (Aubergine)

B. Other plants with roots

Allium porrum L. (Leek)
Beta vulgaris L. (Beet)
Brassica spp.
Fragaria L. (Strawberry)
Asparagus officinalis L.

C. Bulbs, tubers and rhizomes

Allium ascalonicum L. (Shallot)
Allium cepa L. (Onion)
Dahlia spp.
Gladiolus Tourn. Ex L.
Hyacinthus spp.
Iris spp.
Lilium spp.
Narcissus L.
Tulipa L.

Host plants (category A) intended for planting are subject to similar restrictions as for seed potatoes.

- They may only be grown in soil which has been found clear of PCN through a pre-planting soil test, unless they are to be used on the same place of production.
- In order for any field to qualify for the lower sampling rate, documentary evidence must show that no potatoes or other host plants have been grown in the field for the required period.
- Plants which have been grown in a field officially recorded as infested must not be replanted.

Plants in categories B and C, intended for planting, must be grown in soil which has either passed a pre-planting soil test, or where it can be shown that no PCN has been found in the field, or no potatoes or other host plants have been grown in the field, for 12 years. These plants, bulbs etc are exempt from the restrictions if they are washed or brushed until practically free of soil, so that there is no identifiable risk of them spreading PCN. Plants in category C are also exempt if they are intended for replanting only by professional plant or cut flower producers (not for final retail sale).