



PLANT HEALTH DIVISION, PLANT PRODUCTS DIRECTORATE, CANADIAN FOOD INSPECTION AGENCY 59 Camelot Drive Nepean, (Ontario), Canada K1A 0Y9 (Tel: 613-225-2342; FAX: 613-228-6602)	D-95-18
	(EFFECTIVE DATE) July 21, 2004 (2nd Revision)
Title SEED POTATO CERTIFICATION PROGRAM - INVESTIGATION PROCEDURE AFTER <i>Clavibacter michiganensis</i> subsp. <i>sepedonicus</i> HAS BEEN DETECTED ON A SEED POTATO FARMING UNIT	

File

SUBJECT:

This directive contains the guidelines for the investigative procedure that must be followed upon the detection of *Clavibacter michiganensis* subsp. *sepedonicus* (Spieckermann & Kothoff 1914) Davis, Gillaspies, Vidaver & Harris 1984 (*C. m. sepedonicus*), on a seed potato farm unit.

*Changes to the previous version are required to clarify, the extent of an investigation of seed and ware potatoes being grown on a seed potato farm unit, who should be notified and the process followed once notified by foreign plant protection officials of the detection of *Clavibacter michiganensis* subsp. *sepedonicus**

- *Ware potatoes produced on a seed farm unit can be the source of an infection. Clarification is provided to identify the need to consider all potato lots or crops grown on a seed potato farm unit as part of the investigation.*
- *Employees of the provincial government and of the provincial growers' association should be made aware of any detection of *Clavibacter michiganensis* subsp. *sepedonicus* in their respective province in order to perform diligently their mandate and take extra precautionary measures to prevent further spread.*
- *Countries importing Canadian seed potatoes have been monitoring imported seed stocks for the presence of *Clavibacter michiganensis* subsp. *sepedonicus* and may notify CFIA of an interception. There is a need to follow up on a notification from a foreign country to confirm the presence or absence of *Clavibacter michiganensis* subsp. *sepedonicus* and when required take appropriate measures to contain and identify the source of the infection.*

Table of Contents

Review	3
Endorsement	3
Amendment Record	3
Distribution	3
Introduction	3
Scope	4
References	4
Definitions, Abbreviations and Acronyms	4
1.0 General Requirements	5
1.1 Legislative Authority	5
1.2 Regulated pest	5
1.3 Regulated Commodity	5
2.0 Policy	5
2.1 Regulatory Requirements	5
2.2 Grower Notification	6
2.3 Follow Up Actions	6
2.3.1 Notification of an interception by a foreign country plant protection officials	6
2.3.2 Determination of potential sources of infection and contamination	7
2.3.3 Notification of provincial government and potato growers' association representatives	8
2.3.4 Testing requirements for the infected farm unit, contact farm unit and sister lots or crops	8
2.3.5 Additional testing which may be required	9
2.4 Sample Collection and Submission	9
2.4.1 Stem sampling	10
2.4.2 Tuber sampling	10
2.4.3 Identification	10
2.4.4 Packaging and shipping	11
2.5 Laboratory Testing and Results	11
2.6 Final Report	11
3.0 Grower Eligibility	12
3.1 Provisions	12
4.0 Appendix	12
Appendix 1: Flow Chart for <i>C.m. sepedonicus</i> testing once it has been detected on a seed potato farm unit	13

Review

This directive will be reviewed every 3 years. The next review date for this directive is July 21, 2007. The contact for this directive Joanne Rousson. For further information or clarification, please contact the Potato section.

Endorsement

Approved by:

Director, Plant Health Division

Amendment Record

Amendments to this directive will be dated and distributed as outlined in the distribution below.

Distribution

1. Directive mail list (Regions, PHRA, USDA)
2. Provincial Government, Industry (via Regions)
3. National Industry Organizations (determined by Author)
4. Internet

Introduction

This directive deals exclusively with the identification of potato lots or crops, sampling, testing and notification requirements, and documentation needed when the presence of *C. m. sepedonicus* has been confirmed on a seed potato farm unit or notification of an interception from foreign plant protection officials has been received. The investigation is limited to all lots and crops, including the ones not entered for, or rejected from, certification, produced on seed potato farm units. Investigative actions beyond seed producing farm units do not fall under CFIA legislated mandate and may be carried out by provincial or growers' associations representatives depending on their respective mandate. Additionally, this directive provides guidance on the sharing of sensitive information needed by provincial government and growers' associations representatives to deliver their mandates.

The pathogen *C. m. sepedonicus* is the causal agent of Bacterial Ring Rot disease. It is a serious pest that can infect potatoes and cause extensive damage to a potato crop. Under the *Seeds Act* and Regulations there is a zero tolerance for *C. m. sepedonicus* and a mandatory laboratory testing program is in place to maintain the health status of Canadian seed potato stocks. Details of the routine domestic testing program are covered in Directive D-97-12. A copy of this Directive D-97-12 can be found on CFIA website at:

<http://www.inspection.gc.ca/english/plaveg/protect/dir/directe.shtml>

For disease control and possible eradication of *C. m. sepedonicus*, follow up actions are needed once the pathogen and/or the disease has been detected in seed or ware potatoes produced on a

seed potato farm unit. Each individual case must be followed up to contain the infected stocks and determine, whenever possible, the source of infection. Additionally, necessary precautions must be taken to prevent any further spread. It is therefore important to work closely with provincial and growers' association representatives in order for them to take proper precautions to prevent any further spread and oversee the disposal of infected stocks.

Scope This directive is intended for the use of the CFIA inspection staff and growers outlining the sampling and testing requirements, notification and documentation needed when the presence of *C. m. sepedonicus* has been confirmed on a seed potato farm unit.

References Department of the Secretary of State of Canada. *The Canadian Style: A Guide to Writing and Editing*. Toronto, 1993.

This directive supersedes D-95-18 (1st revision) dated March 1, 2000.

Definitions, Abbreviations and Acronyms

Contact farm unit means a farm unit that shared equipment, facility, and/or staff, with the *C.m. sepedonicus* infected farm unit without proper cleanup and disinfection prior to use.

Crop means Breeder's Selection seed potatoes, or a variety and class of seed potatoes, growing in an aseptic environment, a protected environment or in one or more fields of a farm unit.

Farm Unit (a) a single tract of land operated for the production and marketing of seed potatoes under the control of a grower, or
(b) a number of separate tracts of land operated as a single unit, with use of common equipment, facilities or storage, for the production and marketing of seed potatoes under the control of the same grower.

Field means the identifiable area of land on which Breeder's Selection seed potatoes, or seed potatoes of a particular variety and class, are planted or have been produced.

Infected farm unit means a farm unit that produced potatoes determined to be infected with *C.m. sepedonicus*

- Lot** means the quantity of harvested seed potatoes of a variety and class that is identifiable by one certificate number or the quantity of Breeder's Selection seed potatoes that are identifiable by one certificate number.
- Sister Lot** means lot or crop of potatoes planted with the same seed source identified by a unique certification number.
- Ware Potatoes** means potatoes not certified as seed, (eg. table stock and processing potatoes).

1.0 General Requirements

1.1 Legislative Authority

Seeds Act R.S., c. S-8 and amendments 1976-77, c.28 and 1985, c.47
Seeds Regulations and their amendments, SOR/91-526, SOR/93-331,
SOR/95-179, SOR/95-215, SOR/97-118, SOR/2000-184 and SOR/2002-198

1.2 Regulated pest

Clavibacter michiganensis subsp. *sepedonicus* is the pathogen causing bacterial ring rot seed potatoes.

1.3 Regulated Commodity

Potatoes (*Solanum tuberosum*)

2.0 Policy

2.1 Regulatory Requirements

A minimum of two seed lots per farm unit and all seed lots sold as Elite II, Elite III, Elite IV and Foundation class must be sampled and tested, annually, for *C. m. sepedonicus* as described in directive D-97-12. Additionally, the presence of *C. m. sepedonicus* can be detected while performing inspection or analysis required to meet domestic and export requirements for certified and non-certified potatoes produced on a seed potato farm unit or during importing countries monitoring activities. Following confirmation by the Centre of Expertise for Potato Diseases that a crop or a lot produced on a seed farm unit is infected with *C. m. sepedonicus* follow up actions are required to comply with section 50 (3) (b), 50 (4) (d), 52 (3) and 52 (6) of the *Seeds Regulations*.

2.2 Grower Notification

When the presence of *C. m. sepedonicus* has been confirmed by the Centre of Expertise for Potato Diseases, in potatoes grown on a seed potato farm unit, the grower must be notified by the Regional Officer. A laboratory report and a Revocation of Certification (CFIA 2546) must accompany the notification. In cases where a Crop Certificate has not yet been issued, the reason for rejection must be specified on the Report of Field Inspection (CFIA 1284). All crops or lots that have come in contact (see section 2.3.2) with or were produced on the affected farm unit will lose their seed potato status, cannot be planted on a seed potato farm unit (Federal legislation) and in most Canadian provinces (Provincial legislation). The land used to produce the infected crop(s) or lot(s) must remain free of potatoes for at least two years prior to eligibility for re-entry into the seed potato certification program. Also, cleanup and disinfection of equipment, storage(s), etc. must be done to the satisfaction of CFIA inspectors before consideration for the production of seed potatoes will be given to the owner of the farm unit.

If seed potatoes of the same crop year and originating from the infected farm unit were shipped within Canada, prior to the detection of *C. m. sepedonicus*, notification must be prepared by the Regional Officer at origin to the Area Officer at destination providing details on decertification of the lot under section 52.(6) of the Seeds Regulations. The Area Officer is responsible for arranging notification of the receiver of the potatoes from the infected farm unit. If any portion of the infected seed lot was shipped as seed outside of Canada, the National Manager, Potato Section will notify the National Plant Protection Organization of the importing country.

2.3 Follow Up Actions

2.3.1 Notification of an interception by a foreign country plant protection officials

Upon receipt of a notification of an interception of *C. m. sepedonicus* by a plant protection official of a foreign country, the identified seed lot must be sampled at a rate of at least 2000 tubers, labelled and shipped as specified in section 2.4. Any samples retained in storage from the lot and shipment in question must be totally included in the sample submitted for analysis. In the eventuality tubers from the identified seed lot are no longer available, the National Manager of the potato section will explore the possibility of having intact bags re-exported to Canada and shipped to the address specified under 2.4.4 for testing.

In the eventuality the presence of *C. m. sepedonicus* is confirmed, the investigation will proceed as specified in the following sections. However, if the results are negative for the presence of *C. m. sepedonicus* the certification status of the seed lot produced on the farm unit will be maintained.

2.3.2 Determination of potential sources of infection and contamination

The objective of the investigation is to determine the origin of the infection and prevent introduction or further spread into certified seed potatoes. To assist in identification of the source of infection and determine other potentially affected farm units, local inspection personnel must, in discussion with the grower, review the disinfection practices and disinfectant used, planting sequences and assess if any potato handling equipment was shared with other farm units. This information is essential to help determine the source of infection and potential spread and must be forwarded to the Regional Officer. It will be analysed and used to determine which investigative actions are required.

Collaboration between Regional Officer, Area Officer, a representative from the Centre of Expertise for Potato Diseases and a representative from the Potato Section in Headquarters is important in each case. A thorough review of the information gathered during the investigation, along with testing results obtained from seed and ware potatoes grown on the infected farm unit, the sister and contact lots or crops, provides the basis to determine which further actions are required. Appendix I provides a flow chart of the testing requirements that must be met once *C. m. sepedonicus* has been found in potatoes grown on a seed farm unit.

- When all sister lots or crops are found to be negative it is considered that the seed source was not the cause of the infection. In that case, the investigation should focus on the infected farm unit.
- When testing results do reveal the presence of *C. m. sepedonicus* in at least one sister seed lot or crop grown on a different farm unit, the investigation should focus on the farm unit where the seed source was produced.

The investigation should be done on the basis of farm unit(s). Growers managing their seed potato crops as separate farm units, eg., Nuclear Stock managed separately from other seed potato crops, should have submitted separate Applications for Seed Potato Crop Inspection prior to the specified deadlines, for each farm unit. When separate applications have been submitted by a grower and management practices are in place to prevent contact between farm units, they can be considered separate farm units and investigation should proceed accordingly.

Shipments of seed potatoes from a farm unit under investigation must be suspended until all testing of the lots under investigation is completed and the presence of *C. m. sepedonicus* is not detected. Preventing any shipments of seed from a farm unit implicated in an investigation is necessary to limit the spread of *C. m. sepedonicus* in the eventuality that it is present on the farm unit.

Follow-up actions must be carried out in a professional and expedient manner to prevent any spread of the pathogen. Therefore, it is recommended to have all samples from the identified farm units collected and tested within a 2 - 4 week period.

2.3.3 Notification of provincial government and potato growers' association representatives.

Provincial government and potato growers' association representatives must be informed when *C. m. sepedonicus* is detected in a seed potato farm unit and kept informed of any developments during the investigation process. The information is provided to provincial authorities and potato growers' association representatives because they may have to investigate commercial farms, outside the CFIA mandate, and apply provincial regulations. Additionally, provincial and potato growers' association representatives are usually involved in the proper disposal of *C. m. sepedonicus* infected potato stocks and in the clean up and disinfection process.

The notification of provincial government authorities and potato growers' association representatives of the province, in which *C. m. sepedonicus* was detected, should be done by the Regional officer as soon as possible after the presence of *C. m. sepedonicus* has been confirmed on a farm unit. The information communicated to the respective organisations will be limited to what is necessary to carry out their respective mandate. Persons receiving the information will be asked to maintain confidentiality within their respective organization and to use it strictly to carry out their respective mandate.

2.3.4 Testing requirements for the infected farm unit, contact farm unit and sister lots or crops

The investigation should initially concentrate on the infected farm unit, the sister seed lots or crops, and any seed lots or crops which may have come in contact with equipment used on the infected farm unit.

A tuber or stem sample from each one of the following potato lots or crops identified for testing must be submitted for analysis:

- The infected lot or crop will **not** be re-sampled and tested again.
- Lots or crops planted from the same seed source as the infected lot or crop (i.e., sister lots) must be traced back. Each sister lot or crop produced on a seed potato farm unit, entered for certification or not, must be sampled at 2000 tubers or stems and submitted for testing.
- 1000 tubers or stems must be tested from all other seed and non-seed lots or crops produced on the infected farm unit.
- Lots or crops from other farm units that may have come in contact with equipment used on the infected farm unit prior to proper cleanup and disinfection, i.e. custom spray equipment which provides services to several farm units, must be tested at 1000 tubers or stems.

2.3.5 Additional testing which may be required

Seed can be the source of infection. Test results from sister lots or crops are very valuable to establish whether further testing is required to rule out possible contamination of other seed lots or crops.

There is no need to initiate testing on the farm unit which supplied the seed, see section 2.3.2, or the farm units which received seed from the infected unit, if none of the sister seed lots or crops were determined to be infected, unless there is no sister seed lot available for sampling and testing.

2.3.5.1 Seed source from another farm unit

The following testing must be done at the specified rate only when the infected seed lot or crop was planted with seed received from another farm unit; and:

- there is no sister seed lot or crop available; or
- at least one sister seed lot or crop was determined to be infected with *C. m. sepedonicus*:
 - 1000 tubers or stems from all lots or crops of the direct progeny, only one generation, of seed originating from the farm unit which supplied the seed source to the positive lot.

2.3.5.2 Seed source from the infected farm unit

If the infected lot or crop was planted with the grower's own seed, the following testing on seed farm unit is required when there is no sister seed lot or crop, or at least one sister seed lot or crop was determined to be infected with *C. m. sepedonicus*;

- 1000 tubers or stems from each lot or crop produced from seed potatoes supplied by the infected farm unit. It only applies to lots or crops that are the direct progeny and grown or produced on a seed farm unit, not the ones that have been produced for more than one generation.

2.4 Sample Collection and Submission

All samples collected to comply with this directive are considered investigative samples and must be collected by or under the supervision of a CFIA inspector and shipped as specified in section 2.4.4. Samples collected for the routine domestic testing program and tested in CFIA accredited laboratories are not to be considered as investigative samples.

2.4.1 Stem sampling

Stem sampling must be done as prescribed in section 3.2 of Directive D-97-12. Plants expressing Bacterial Ring Rot disease symptoms should be collected and packaged separately.

2.4.2 Tuber sampling

Tubers should be collected randomly to represent the entire seed lot. Any tubers showing Bacterial Ring Rot disease symptoms should be collected and packaged separately.

Although it is preferable to send tuber samples for testing, in certain circumstances, individual tubers may be considered to be quite valuable to the grower. Therefore, it is possible to core the tubers on the farm unit in accordance with the instructions in section 3.3 of directive D-97-12. Necessary precautions must be taken to avoid any potential cross-contamination of the tubers and samples during the coring process.

2.4.3 Identification

Samples from different potato lots or crops must be submitted in separate bags to maintain sample integrity. When there is more than one bag per sample indicate the number of bags must be indicated. When a sample is collected over more than one field, it is advisable to submit each portion of the sample in separate bags and identify them accordingly. A "Plant Health Submission, Sample for Submission to the Centre for Animal and Plant Health, Charlottetown, PEI" CFIA 5161 PEI must be completed and sent along with each sample for continuity.

The following information is required on the label affixed to each bag, otherwise the sample will not be tested until correct identification is received:

- Grower's or corporation name.
- Variety name
- Certification number or seed source number
- Class assigned (if applicable)
- Number of field sample units (ie. Number of stems or tubers)
- Date planted (required for stem samples only)
- Date collected
- Grower's or representative's signature (not mandatory)
- Inspector's signature
- Test for which sample is submitted.

2.4.4 Packaging and shipping

Refer to directive D-97-12 section 3.5 for instructions on how to package and ship the samples. All the samples collected for investigation purposes must be forwarded to;

Centre for Animal and Plant Health
Centre of Expertise for Potato Diseases
93 Mount Edward Road
Charlottetown, PEI
C1A 5T1

2.5 Laboratory Testing and Results

The Regional Officer where the sample originated is the contact person for the Centre of Expertise for Potato Diseases. It is the responsibility of the Regional Officer to inform the Centre of Expertise for Potato Diseases with respect to the expected volume of testing and the time frame for the delivery of the samples.

All investigative samples testing for *C. m. sepedonicus* are performed by the Centre of Expertise for Potato Diseases. Results are forwarded to the Regional Officer for further distribution and follow up action.

2.6 Final Report

The Regional Officer must provide the Area Officer, the Centre of Expertise for Potato Diseases and the National Manager, Potato Section with the following documentation within 30 days of the detection of *C. m. subsp. sepedonicus*;

- Copy of notification to grower with completed CFIA 5161 PEI -Plant Health Submission, Sample for Submission to the Centre for Animal and Plant Health, Charlottetown, PEI;
- CFIA 2546 - Revocation of Certification or CFIA 1284 - Report of Field Inspection.
- CFIA 1317, Application for Seed Potato Crop Inspection.
- A copy of all laboratory reports.
- Officer's report, which should cover the following items;
- Background information on the farm unit(s) eg; previous cases, and seed vs commercial production
- Management practices eg; disinfection, planting sequence, sharing of equipment, crop rotation and land rental
- Investigation results
- Conclusion eg; difficulties experienced, lots no longer available, and possible source of infection

3.0 Grower Eligibility

3.1 Provisions

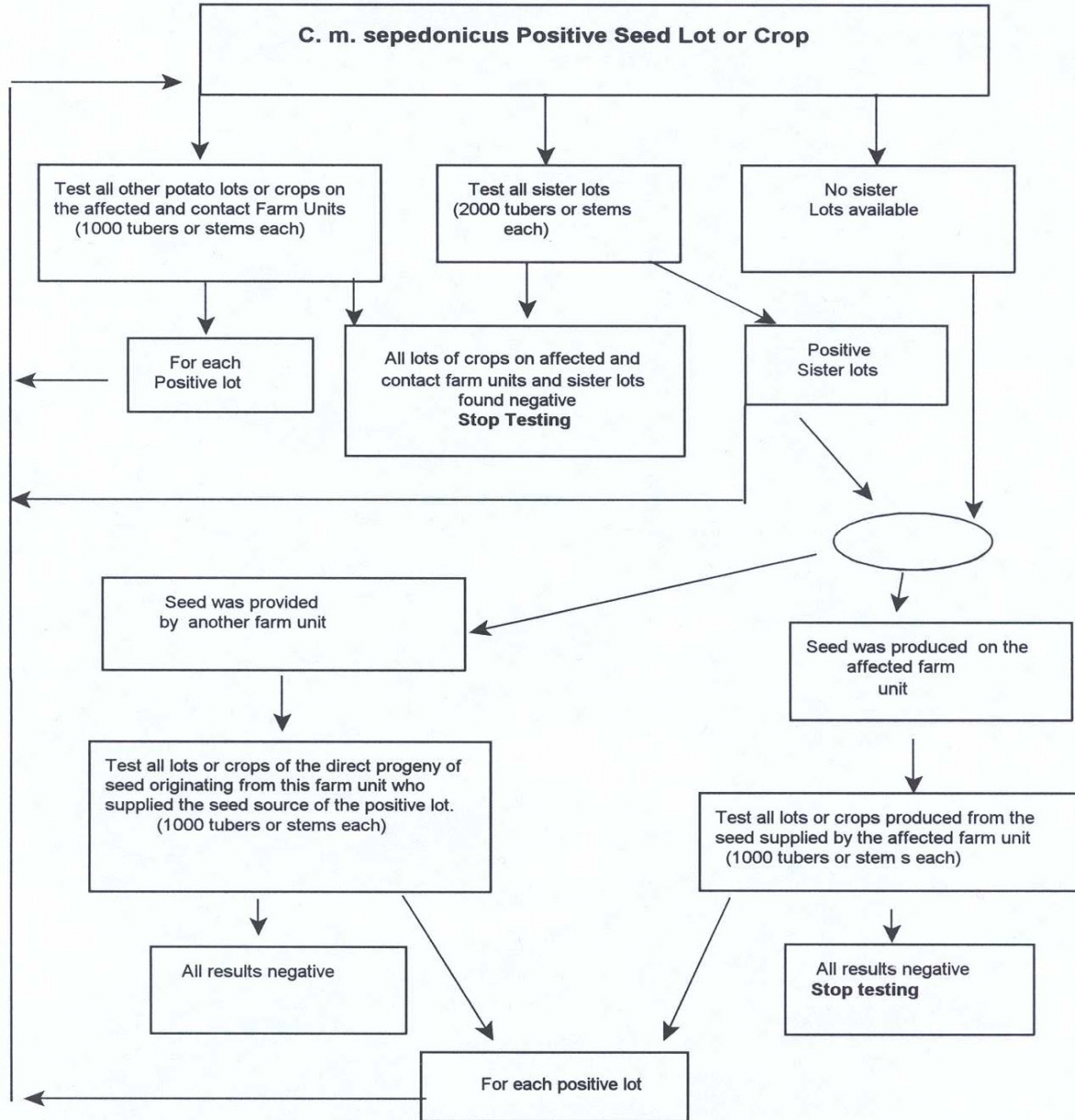
Following an outbreak of Bacterial Ring Rot, *C. m. sepedonicus*, a grower must:

- submit in writing, their intention to re-enter the seed potato certification program, to a local office of the CFIA.
- under the supervision of a CFIA inspector, follow the criteria as outlined in the Seed Potato Regulations and Manual, for all appropriate clean-up and disinfection procedures prior to receiving seed potatoes for planting.
- ensure that the land to be planted with seed potatoes was not used to produce BRR infected potatoes in the previous two years.
- plant all potato crops on the farm unit with Foundation class seed or better.
- make application for inspection as prescribed under the Seed Potato Regulations, Part II of the *Seeds Act*. Comply with all elements of the act and regulations as prescribed.
- have a random sample of 1000 tubers or stems taken by a CFIA inspector, for each seed lot produced on the farm unit, in the subsequent three years of seed production.
- submit for testing against *C. m. sepedonicus* each sample, collected under the supervision of a CFIA inspector, to an accredited laboratory and the Centre of Expertise for potato diseases as prescribed in D-97-12.

4.0 Appendices

Appendix 1 - Flow Chart for *C.m. sepedonicus* testing once it has been detected on a seed potato farm unit

Appendix 1: Flow Chart for *C. m. sepedonicus* testing once it has been detected on a seed potato farm unit.



Note: Provincial government and potato growers' association representatives must be kept informed and may conduct further investigation on commercial units.