



## **NAPPO Regional Standards for Phytosanitary Measures (RSPM)**

### **RSPM No. 18**

### **Guidelines for Phytosanitary Action Following Detection of Plum Pox Virus**

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## Contents

	Page
Review	4
Endorsement	4
Implementation	4
Amendment Record	4
Distribution	4
<b>Introduction</b>	<b>5</b>
Scope	5
References	5
Definitions, Abbreviations and Acronyms	5
Outline of Requirements	7
<b>1. Rationale</b>	<b>7</b>
1.1 Spread by Propagation	7
1.2 Aphid Spread	8
1.3 Spread from Infected Fruit	8
1.4 Non-Certified Stock	8
1.5 Virus-certified Stock	8
1.6 Surveillance	8
<b>2. Actions Taken After Detecting PPV</b>	<b>8</b>
2.1 Delimiting Surveys	9
2.2 Quarantine Area	9
2.3 Eradication	9
2.4 Trace-back and Trace-forward Investigation and Associated Surveys	9
2.5 Detection Surveys	9
<b>3. Pest Free Areas (PFA)</b>	<b>10</b>
3.1 Establishment of a PFA	10
3.1.1 Boundaries	10
3.1.2 Movement restrictions	10
3.1.3 Surveys	10
3.2 Maintenance of a PFA	10
3.2.1 Movement Restrictions	10
3.2.2 Monitoring	10

<b>4.</b>	<b>Pest Free Places of Production (PFPP) and Pest Free Production Sites (PFPS)</b>	10
4.1	Establishment of a PFPP or a PFPS	11
4.1.1	Additional Requirements for a PFPP or a PFPS	11
4.1.1.1	Field grown plants for planting and propagation	11
4.1.1.2	Plants for planting and propagation in an enclosed facility	11
4.2	Maintenance of a PFPP or a PFPS	11
4.2.1	Buffer Zone	11
4.2.2	Virus-certified Sources	11
4.2.3	Non-certified Sources	11
4.3	PFPS within Infested Areas	12
<b>5.</b>	<b>Change in Status of a PFA, PFPP or PFPS</b>	12
<b>6.</b>	<b>PPV Eradication</b>	12
6.1	Survey Criteria to Confirm PPV Eradication	12
6.2	Additional Measures Following Eradication	12
<b>7.</b>	<b>Monitoring Country Freedom</b>	12
<b>8.</b>	<b>Certification Programs</b>	12
<b>9.</b>	<b>Bilateral Agreements</b>	13
<b>Appendix 1:</b>	<b>Statistical Basis for Surveys</b>	14

## **Review**

NAPPO Regional Standards for Phytosanitary Measures are subject to periodic review and amendment. The next review date for this Standard is 2009. Review of any NAPPO Standard may be initiated at any time upon the request of a NAPPO member country.

## **Approval**

This Standard was originally approved by the North American Plant Protection Organization (NAPPO) Executive Committee on October 20, 2002. This amended version was approved on October 17, 2004, and is effective immediately.

## ***Original Signed by:***

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## **Implementation**

No Implementation Plans are required as only minor revisions have been made to this standard.

## **Amendment Record**

Amendments to this Standard will be dated and filed with the NAPPO Secretariat. The most recent version will be posted on the NAPPO website at: [www.nappo.org/stds\\_e.htm](http://www.nappo.org/stds_e.htm)

## **Distribution**

This standard is distributed by the Secretariat of the NAPPO within NAPPO, including Sustaining Associate Members and Industry Advisory Groups, to the FAO IPPC Secretariat and to the Administrative Heads of the Regional Plant Protection Organizations (RPPOs).

## Introduction

### Scope

These guidelines outline the recommended procedures prior to allowing the importation of Plum Pox Virus (PPV) susceptible plants for planting and propagation. They apply to situations where the extent of an outbreak has not been clearly defined. They do not prescribe criteria for movement of host material from areas where PPV does not occur or from a country that is generally infested. These guidelines do not preclude other requirements (e.g. certification) for the movement of *Prunus* plants for planting and propagation between countries.

### References

- Glossary of Phytosanitary Terms*, ISPM No. 5, FAO, Rome.
- Guidelines for Surveillance*, 1998. ISPM No. 6, FAO, Rome.
- Guidelines for Pest Eradication Programs*. 1999. ISPM No. 9, FAO, Rome.
- Hughes, G., and Gottwald, T. R. 1998. *Survey methods for assessment of Citrus tristeza virus incidence*. *Phytopathology* 88:715-723.
- Hughes, G., Gottwald, T. R., and Yamamura, K. 2002. *Survey methods for assessment of Citrus tristeza virus incidence in urban citrus populations*. *Plant Disease* 86:367-372.
- Hughes, G. and Gottwald, T. R. 2001. *Survey methods for assessment of Citrus tristeza virus incidence in citrus nurseries*. *Plant Disease* 85:910-918.
- Hughes, G., Gottwald, T. R., and Levy, L. 2002. *The use of hierarchical sampling in the surveillance program for Plum pox virus incidence in the United States*. *Plant Disease* 86:259-263.
- Requirements for the Establishment of Pest Free Areas*. 1996. ISPM No. 4, FAO. Rome.
- Requirements for the Establishment of Pest Free Places of Production and Pest Free Production Sites*, 1999. ISPM No. 10, FAO, Rome.
- Labonne, G. and Quiot, J.B. 2001. *Aphids can acquire plum pox virus from infected fruits*. *Acta Horticulturae* 550:79-83

### Definitions, Abbreviations and Acronyms

buffer zone	An area in which a specific pest does not occur or occurs at a low level and is officially controlled, that either encloses or is adjacent to an infested area, an infested place of production, a pest free area, a pest free place of production or a pest free production site, and in which phytosanitary measures are taken to prevent spread of the pest (FAO)
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delimiting survey	Survey conducted to establish the boundaries of an area considered to be infested by or free from a pest (FAO)
detection survey	Survey conducted in an area to determine if pests are present (FAO)
eradication	Application of phytosanitary measures to eliminate a pest from an area (FAO)
International Plant Protection Convention	International Plant Protection Convention, as deposited with FAO in Rome in 1951 and as subsequently amended (FAO)
International Standard for Phytosanitary Measures	An international standard adopted by the Conference of FAO, the Interim Commission on phytosanitary measures or the Commission on phytosanitary measures, established under the IPPC (FAO)
IPPC	International Plant Protection Convention, as deposited in 1951 with FAO in Rome and as subsequently amended (FAO)
ISPM	International Standard for Phytosanitary Measures (FAO)
NAPPO	North American Plant Protection Organization (NAPPO)
NPPO	National Plant Protection Organization (FAO)
National Plant Protection Organization	Official service established by a government to discharge the functions specified by the IPPC (FAO)
Official	Established, authorized or performed by a National Plant Protection Organization (FAO)
Outbreak	A recently detected pest population, including an incursion, or a sudden significant increase of an established pest population in an area (FAO)
Pest Free Area	An area in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained (FAO)
Pest free place of production	Place of production in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained for a defined period. (FAO)
Pest free production site	A defined portion of a place of production in which a specific pest does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained for a defined period, and that is managed as a separate unit in the same way as a pest free place of production. (FAO)
PFA	Pest free area (FAO)
PFPP	Pest free place of production (NAPPO)
PFPS	Pest free production site (NAPPO)

Phytosanitary Action	An official operation, such as inspection, testing, surveillance or treatment, undertaken to implement phytosanitary regulations or procedures (FAO)
Quarantine area	An area within which a quarantine pest is present and is being officially controlled (FAO)
Survey	An official procedure conducted over a defined period of time to determine the characteristics of a pest population or to determine which species occur in an area (FAO)
Virus-certified stock	Plants for planting and propagation produced under an official virus testing and certification program. (NAPPO)

## Outline of Requirements

Given the discovery of Plum pox virus (PPV) Strain D in Pennsylvania, U.S.A. in 1999 and in Ontario, Canada in 2000, the Executive Committee of the North American Plant Protection Organization (NAPPO) requested its Fruit Tree Panel to examine options for the safe movement of PPV-susceptible plants for planting and propagation among the NAPPO countries. In light of current eradication efforts in Pennsylvania and Ontario, the Panel focused on actions taken after detecting PPV and on the FAO standards for Pest Free Areas (PFA), Pest Free Places of Production (PFPP) and Pest Free Production Sites (PFPS) as potential alternative phytosanitary options.

This document provides procedures for National Plant Protection Organizations (NPPOs) of the NAPPO countries to use during a PPV outbreak in order to engage in bilateral discussions with other NPPOs to recognize parts of their countries as free of PPV, thus allowing movement of susceptible host material from these areas. The following general procedures apply: certification, surveys, quarantine/controlled movement, audit, boundary (officially recognized), and appropriate documentation. A suggested method for conducting surveys is outlined in Appendix 1.

These guidelines outline the basic procedures that should be considered for defining the extent of the outbreak, as well as the protocol to declare eradication. The guidelines also outline procedures for establishing and maintaining a PFA, PFPP and PFPS to allow ongoing trade in PPV susceptible plants for planting and propagation. Additional procedures may be agreed to on a bilateral basis.

Even though a country has declared eradication, continued PPV virus testing of export plants for planting and propagation and other surveys and inspections (as per Sections 1.5, 1.6, 6 and 7) are recommended as an ongoing process.

### 1. Rationale for Regulatory Actions

### 1.1 Spread by Propagation

Long distance spread of PPV is mainly by movement of diseased plants for planting and propagation. These guidelines puts the highest priority on eliminating possible spread in this manner.

### 1.2 Aphid Spread

The distance over which aphid vectors can move PPV is variable. Reported distances in published literature vary from a few meters to more than a kilometer. The measures listed in these guidelines are based on the fact that virus spread is more likely in the immediate area of infection (up to 600 m) and less frequently in the areas beyond.

### 1.3 Spread from Infected Fruit

PPV-infected fruit is a potential inoculum reservoir for aphid acquisition and possible transmission to healthy trees. Fruit from infested areas poses a risk to these trees. Therefore, culled fruit should be handled in a manner which precludes aphid access and transmission to healthy trees.

### 1.4 Non-certified Stock

The propagation and movement of non-certified stock poses the greatest risk for spreading PPV. In nurseries, non-certified stock may be grown in close proximity to virus-certified stock and, therefore, warrants the extra precautions described in these guidelines.

### 1.5 Virus-certified Stock

All NAPPO countries should include testing for PPV as part of their certification programs. North American certification programs were not designed to protect against pathogens vectored by aphids i.e. PPV. Ultimately, these programs may need to be amended to increase isolation distance requirements for growing virus-certified stock. Virus-certified source trees for seed, scionwood and rootstock should be tested for PPV at least once every three years, even after eradication of PPV is achieved.

### 1.6 Surveillance

Experience from Pennsylvania and Ontario, where the virus was present for some years, showed that general surveillance such as literature reports, general observations etc. failed to detect PPV before it had spread significantly. Thus, specific methods such as surveys and packing house inspections should be conducted. It is strongly recommended that these measures be continued when PPV eradication is declared to aid in the early detection of any future PPV introductions.

## 2. **Actions Taken After Detecting PPV**

Following the initial detection of PPV, delimiting and detection surveys and trace-back and trace-forward should be carried out and a quarantine area established as soon as possible. The

goal should be to define those areas where PPV is present, identify the extent of the infestation, and contain it to facilitate both the eradication of the infestation and the safe movement of PPV hosts.

### 2.1 Delimiting Surveys

The delimiting survey is an intensive survey to identify the area infested by PPV, including sites with known infestations, and those sites potentially infested as established by trace-back and trace-forward and other similar investigations. These surveys should include all susceptible species in orchards, nurseries, natural areas, residential, public and commercial properties, etc. The purpose of this survey is to determine the extent of the infested area and facilitate the establishment of a quarantine area around the infestation. The survey methodology should be statistically sound such as the hierarchical sampling described in Appendix 1.

### 2.2 Quarantine Area

The quarantine area should be officially established and include all infested areas. It is suggested that a buffer zone of at least 1.5 kilometers from all outlying positive trees be used to define a quarantine area. Movement out of the quarantine area of susceptible species and their propagative parts should be controlled. Intensive surveys should continue within the quarantine area until eradication. Detection surveys are recommended to 10 km beyond a quarantine area. After eradication, surveys should continue within the former quarantine area (see Section 5).

### 2.3 Eradication

Where practical, an eradication program should be initiated in the quarantine area. This program should consider elimination of infested trees, exposed trees and tree regrowth, vector control, replant limitations, and other procedures. The program should apply to all infested host material regardless of location, e.g. orchards, nurseries, natural areas, residential, public or commercial properties, etc. Also see Section 5.

### 2.4 Trace-back and Trace-forward Investigation and Associated Surveys

Trace-back and trace-forward investigations should be initiated to identify origin and distribution of all plants for planting and propagation that have entered or been removed from the quarantine area. This material may be the source of the infestation and/or indicate other potentially infested locations. The immediate surrounding area of both the recipient and provider of the plants for planting and propagation should be intensively surveyed.

### 2.5 Detection Surveys

Plants for planting and propagation, e.g. rootstock, budwood, seed, and finished trees, should be intensively surveyed for the presence of PPV.

A general survey of susceptible species should be conducted in orchards, packing houses, natural areas, residential, public, and commercial properties, etc. The purpose of this survey is

to identify infestations of PPV. The hierarchical sampling (see Appendix 1) or another statistically sound method should be used to the extent possible, especially in areas of high risk of spread or likelihood of occurrence.

### **3. Pest Free Areas (PFA)**

Areas where general surveillance indicate that PPV is not present are suitable for the establishment of a PFA. This option should be avoided within infested areas due to the biology of PPV. If the PFA is located within a country, or part of a country, that is later declared free of PPV, these procedures are no longer necessary. However, the maintenance of a PFA should minimize the effect of a subsequent infestation.

#### 3.1 Establishment of a PFA

##### 3.1.1 Boundaries

The area should be described based on officially recognized boundaries. Physical features that can act as natural barriers should be identified. The PFA should be no closer than 10 km from a quarantine area.

##### 3.1.2 Movement Restrictions

Only material from another PFA, PFPP or PFPS or material that has been officially tested and found free of PPV may be permitted to enter into a PFA.

##### 3.1.3 Surveys

All survey procedures to detect and delimit PPV as described in sections 2.1 and 2.5 apply to the establishment of a PFA.

#### 3.2 Maintenance of a PFA

##### 3.2.1 Movement restrictions

Movement restrictions described in section 3.1.2 should be maintained.

##### 3.2.2 Monitoring

The requirements for general surveillance as described in the ISPM No. 4, *Requirements for the Establishment of Pest Free Areas* should be followed. This should be supplemented by surveying sources of rootstock, budwood and seed, and monitoring of cull fruit at packing houses and canneries. Surveys of orchards are also recommended.

### **4. Pest Free Places of Production (PFPP) and Pest Free Production Sites (PFPS)**

This option could be implemented in non-surveyed areas where general surveillance indicates that PPV is not present. Due to the biology of PPV, this option should be avoided within infested areas (see exception under section 4.3). If the PFPP or PFPS is located within a

country, or part of a country, that is later declared free of PPV, these procedures are no longer necessary. However, the maintenance of a PFPP or PFPS should minimize the effect of a subsequent infestation. ISPM No. 10, *Requirements for the Establishment of Pest Free Places of Production and Pest Free Production Sites*, contains further details of the concept and criteria for PFPPs and PFPSs.

#### 4.1 Establishment of a PFPP or a PFPS

All requirements to establish a PFA in Section 3.1 apply to this section.

##### 4.1.1 Additional Requirements for a PFPP or a PFPS

###### 4.1.1.1 Field grown plants for planting and propagation

Virus-certified stock should be isolated from non-certified stock by a minimum of 600 m unless sources of rootstock, budwood and seed used to produce the non-certified stock are tested for PPV. Non-certified source trees from which propagative material is harvested should be tested within one year prior to, or one year after, the collection of the propagative material. Trees produced from non-certified sources should not leave the PFPP or PFPS until the above testing is complete.

**Buffer Zone** - All PPV susceptible species within 600 m of the nursery, including orchards, other nurseries, natural areas, residential, public and commercial properties should be surveyed. All orchards and nursery plantings should be surveyed by hierarchical sampling (Appendix 1) or another statistically sound method. All plants of PPV susceptible species within natural areas, residential, public and commercial properties should be individually tested.

###### 4.1.1.2 Plants for planting and propagation in an enclosed facility

The facility structure should be constructed to exclude PPV vectors. Production practices should include measures to prevent entry of PPV vectors and PPV infested material into the facility.

**Buffer Zone** - All plants of PPV susceptible species within 40 m of the enclosed facility should be removed or regularly tested.

#### 4.2 Maintenance of a PFPP or a PFPS

All requirements to maintain a PFA in section 3.2 apply to this section.

##### 4.2.1 Buffer Zone

The buffer zones described in 4.1.1.1 and 4.1.1.2 should be surveyed at least every 3<sup>rd</sup> year.

#### 4.2.2 Virus-certified Sources

Virus-certified propagative source material (e.g. rootstock, budwood, and seed, etc.) should be surveyed at least every 3<sup>rd</sup> year and buffer zones maintained according to the criteria described in 4.1.1.1 and 4.1.1.2.

#### 4.2.3 Non-certified Sources

Non-certified source trees from which propagative material is harvested should be tested within one year prior to, or one year after, the collection of the propagative material. Trees produced from non-certified sources should not leave the PFPP or PFPS until the above testing is complete.

#### 4.3 PFPS within Infested Areas

PPV susceptible species may be moved from an infested area only if it is certified free of PPV and originates from an enclosed, NPPO-approved facility as described in 4.1.1.2.

### 5. **Change in Status of a PFA, PFPP or PFPS**

The detection of PPV within a PFA, PFPP or PFPS will immediately revoke the PPV free status of the area. To regain pest free status the procedures in section 6. below should be followed.

### 6. **PPV Eradication**

ISPM No. 9, *Guidelines for Pest Eradication Programmes*, should be consulted in addition to the PPV-specific criteria and measures described below.

#### 6.1 Survey Criteria to Confirm PPV Eradication

Intensive surveys in the quarantine area should include all susceptible species in orchards, nurseries, natural areas, residential, public and commercial properties, etc. All orchards should be surveyed using the hierarchical sampling described in Appendix 1 or another statistically sound method. In addition, monitoring of cull fruit at packing houses and canneries, etc. should be done.

Three consecutive years of negative survey results are needed to declare eradication of the PPV infestation.

Delimiting surveys are recommended to 10 km beyond a quarantine area.

#### 6.2 Additional Measures Following Eradication

Surveys within the quarantine area should continue for three years after declaration of eradication albeit at a less intensive level. During the three year monitoring period, nurseries would be eligible to ship plants for planting and propagation of susceptible species from the area but are required to maintain propagation and sales records.

**7. Monitoring Country Freedom**

After eradication is declared, the requirements for general surveillance as described in the ISPM No. 6 *Guidelines for Surveillance* should be followed. This should be supplemented by surveying sources of rootstock, budwood and seed, and monitoring of cull fruit at packing houses and canneries. Surveys of orchards are recommended.

**8. Certification Programs**

Currently, the international movement of PPV susceptible plants for planting and propagation is restricted to certification programs. Because of the biology and economic impact of the disease, testing for PPV should be included in a certification program regardless of the PPV status in the area. Every source tree, including rootstock, budwood and seed used in the certification program should be tested for PPV at least every three years. Virus-certified stock and its propagative source material should be located no closer than 10 km from a quarantine area.

**9. Bilateral Agreements**

Scientifically and technically justified modifications to the application of these guidelines may be agreed to on a bilateral basis.

## **Appendix 1: Statistical Basis for Surveys**

Hierarchical sampling is based on techniques developed for the detection of Citrus tristeza virus, another aphid vectored fruit tree virus (Hughes and Gottwald, 1998) and has been adapted for PPV surveys (Hughes, Gottwald, and Levy, 2002). About 25% of the trees in a block are sampled in groups of four trees. The incidence of infected trees can be predicted from the number of positive samples. Details of the survey method are available from the NPPOs of Canada, the United States and Mexico.

To determine if PPV is present in a large area such as a state or province, it is not necessary to survey the entire production area. A portion can be selected for survey by hierarchical sampling according to the procedures used by Hughes, Gottwald, and Yamamura (2002).

If PPV is not detected, then the virus is considered not to be present above a specified level of detection in each block sampled.