NAPPO
North American Plant Protection Organization
Organización Norteamericana de Protección a las Plantas

NAPPO Regional Standards for Phytosanitary Measures (RSPM)

RSPM 16
Integrated Measures for the Movement of Citrus Propagative Material

North American Plant Protection Organization Secretariat
1431 Merivale Rd. 3rd Floor, Room 140
Ottawa, Ontario, K1A OY9, Canada
March 19, 2013

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Review

NAPPO Regional Standards for Phytosanitary Measures are subject to periodic review and amendment. The next review date for this NAPPO standard is 2018. This Standard was last reviewed in 2013. A review of any NAPPO Standard may be initiated at any time upon the request of a NAPPO member country.

Approval

This standard was updated and approved by the North American Plant Protection Organization (NAPPO) Executive Committee on March 19, 2013, and is effective immediately.

Approved by:

Greg Wolff
Executive Committee Member
Canada

Rebecca A. Bech
Executive Committee Member
United States

Javier Trujillo Arriaga
Executive Committee Member
Mexico

Implementation

See the attached implementation plans for implementation dates in each NAPPO member country.

Amendment Record

Amendments to this Standard will be dated and filed with the NAPPO Secretariat.

Distribution

This standard is distributed by the NAPPO Secretariat, to the Industry Advisory Group and Sustaining Associate Members, the International Plant Protection Convention (IPCC) Secretariat, and to other Regional Plant Protection Organizations (RPPOs).

Introduction

Citrus pests have become a limiting factor in the trade of citrus propagative materials. Importers are seeking a supply of material which meets the phytosanitary requirements established by their National Plant Protection Organization. The exporting industry is seeking transparent import requirements in order to develop and apply production measures that will enable access to foreign markets. The application of harmonized measures among NAPPO members should facilitate trade in citrus propagative material while ensuring compliance with importing countries' phytosanitary requirements.

The measures outlined in this standard, if necessary, may be used as the basis for developing more specific and detailed bilateral agreements for trade in citrus propagative materials.

Scope

This standard provides guidelines for the application of integrated phytosanitary measures to facilitate the safe trade of citrus propagative material. These measures are intended to reduce the likelihood of pests moving on such material.

References

ISPM 1. 2006. *Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade.* Rome, IPPC, FAO.

ISPM 2. 2007. *Framework for pest risk analysis.* Rome, IPPC, FAO.

ISPM 5. (updated annually). *Glossary of phytosanitary terms.* Rome, IPPC, FAO

ISPM 8 .1998. *Determination of pest status in an area*. Rome, IPPC, FAO.

ISPM 36. 2012. *Integrated measures for plants for planting*. Rome, IPPC, FAO.

RSPM 5. (updated annually). *NAPPO Glossary of phytosanitary terms*. Ottawa,NAPPO.

RSPM 9. 2009. *The authorization of laboratories for phytosanitary testing.* Ottawa, NAPPO.

RSPM 24. 2005. *Integrated pest risk management measures for the importation of plants for planting into NAPPO member countries*. Ottawa, NAPPO.

Definitions, Abbreviations, Acronyms

Definitions of phytosanitary terms used in the present standard can be found in ISPM 5 and RSPM 5.

The terms certification, registration or approval are used by different countries to refer to the process of recognition of a place of production that follows practices previously agreed upon to reduce the likelihood of movement of regulated pests. For consistency with ISPM 36: 2012 and RSPM 24:2005, this standard will use the term “approval”.

Outline of Requirements

This standard provides guidelines for the establishment of an integrated approach to the management of citrus propagative material (during production and the export process) to minimize the risk of international movement of regulated pests. It describes options that can be implemented in exporting and importing countries to mitigate pest risk associated with the movement of citrus propagative material.

Specific Requirements

1. Importing Countries

Countries that import citrus propagative material usually require that specific phytosanitary measures be taken in the exporting country. These measures, including the requirements to obtain the phytosanitary certificate, may be described in a bilateral agreement. Other possible phytosanitary measures include:

1.1 Import requirements

The NPPO of the importing country will communicate the current import requirements to the importer for the movement of citrus propagative material, in particular if there is no bilateral agreement in place.

1.2 Approval process for places of production

The importing country requires that imported citrus propagative material may only be sourced from approved places of production. Guidance for an approval process for places of production may be found in ISPM 36: 2012.

Prior to the first exportation, officials of the NPPO of the importing country, or their designate, may evaluate through pre-clearance places of production interested in exporting citrus propagative material.

1.3 Inspection and testing

Imported citrus propagative material may also be subject to inspection and testing for regulated pests that may include diagnostics or other tests to ensure the material is clean. This may take place upon arrival at the first point of entry or the final destination in the importing country and prior to release to nurseries for increase and distribution (see Appendices 1 and 2 for accepted diagnostic methods and tests) . Diagnostic tests should be conducted in laboratories approved according to RSPM 9: 2009.

1.4 Post-entry quarantine

Holding material in a post-entry facility may be necessary pending results of inspection and testing._The importing country may adjust this requirement where the exporting country can demonstrate that conditions outlined in section 2 of this standard have been met.

2. Exporting Countries

Exporting countries may develop a pest management program that will address the importing country's phytosanitary requirements.

The program may include one or more of the measures described in the next sections.

2.1 NPPO of the exporting country

The NPPO of the exporting country should be able to demonstrate that the citrus propagative material comes from approved places of production and that the production processes at these places and the testing implemented by approved laboratories have been carried out to meet the importing country phytosanitary requirements. Plants must be maintained in a secure environment in facilities operated by the federal or state government, or approved universities or private entities. The NPPO will determine the characteristics of places of production for each type of propagative material.

The NPPO of the exporting country or its designate should document the roles and responsibilities of all individuals and organizations participating in the pest management program.

In addition, the NPPO of the exporting country or its designate should document the training, experience, educational, and proficiency requirements of all staff employed in the program.

The NPPO of the exporting country will provide the NPPO of the importing country with a list of approved places of production, and update the list annually. Any change in the approval process or the list of approved places of production shall be reported immediately to the NPPO of the importing country.

Terminology

The NPPO of each country should include a section in the management program in which all terminology specific to the approval process is defined in sufficient detail to allow a clear understanding of the requirements.

Quality system

The NPPO of the exporting country should verify that a quality system is in place to ensure validity and reliability of the places of production and the production techniques used for plant material. They will issue the appropriate approval based on these requirements.

Non-compliance and corrective actions

Approval of a place of production may be suspended pending determination of the extent of non-compliance and what corrective actions are necessary to reinstate the eligibility of the place of production. Non-compliance may be due to the presence of a regulated pest or to administrative reasons such as mistakes in documentation. Criteria for reinstatement of the eligibility of the exporting place of production, or country as the case may be, should be elaborated in a bilateral agreement and also included in the exporting country pest management program.

2.2 Requirements of places of production

Places of production must meet the requirements of the pest management program agreed to by the importing and exporting NPPOs, in order to qualify as an approved place of production.

Eligibility for export of citrus propagative materials

All places of production wishing to supply citrus propagative materials for export must be approved by their NPPO or its' designate.

Agronomic requirements

The NPPO should require that approved places of production of citrus propagative material follow good agronomic practices, including hygiene, pest control, examination of incoming plant material, and maintenance of records, among others, as described in ISPM 36: 2012.

Isolation and sanitation

Approved citrus places of production must comply with sanitary and isolation requirements established by the importing country. Material intended for export must be maintained in a secure environment.

Inspection and testing

The NPPO will specify the inspection and testing requirements for approved citrus propagative material. Collection of samples, inspection and pest diagnostics should be done at the most appropriate time for detection of regulated pests and using approved methods (see Appendices 1 and 2). Any specific protocols as agreed to by the importing and exporting NPPOs must be followed.

Documentation and identification

The places of production and laboratories should retain records of inspection and testing results to ensure their eligibility, status, and compliance with the phytosanitary requirements of the program.

Donor plants from approved places of production must be accurately identified. Records for the propagative material donor plants should be maintained during the plant's useful life, and for at least one additional year.

2.3 Bilateral workplans

Exporting and importing country NPPOs may decide that a bilateral workplan is necessary to elaborate on these guidelines. Modifications to these guidelines should be technically justified.

This appendix was adopted by the NAPPO Executive Committee on March 19, 2013 and will be updated annually by the NAPPO Citrus Panel.
The appendix is for reference purposes only and is not a prescriptive part of the standard.

Appendix 1: Regulated diseases and pathogens associated with citrus propagative material: presence or absence in NAPPO member countries and accepted diagnostic tests.

The status of diseases and pathogens is determined by each NPPO.

Presence or absence, unless otherwise noted, conforms to the categories listed in ISPM 8: 1998. For ease of reference alpha-numeric designations have been added here.

Ab1: Absent: no pest records
Ab2: Absent: pest eradicated
Ab3: Absent: pest no longer present
Ab4: Absent: pest records invalid
Ab5: Absent: pest records unreliable
Ab6: Absent: intercepted only
Ab7: Absence: confirmed by survey
Ab8: Absence: pest free area declared

P1: Present: in all parts of the area
P2: Present: only in some areas
P3: Present: except in specified pest free areas
P4: Present: in all parts of the area where host crop(s) are grown
P5: Present: only in some areas where host crop(s) are grown
P6: Present: only in protected cultivation
P7: Present: seasonally
P8 Present: but managed
P9 Present: subject to official control
P10: Present: under eradication
P11: Present: at low prevalence.
P12: Present: not associated with host crop (NAPPO category)

Disease	Pathogen	Presence/Absence		Accepted Diagnostic Tests
		USA	MEXICO	
	Viruses			
Tristeza (Quick decline, Stem pitting, Seedling yellows)	*Citrus tristeza virus* (CTV)	P4 and P9 (CA)	P4 and P9	Index on Mexican lime and/or inmunoimpresion or ELISA
Concave gum Psorosis A & B (including ringspot)	*Citrus psorosis virus* (CPsV-A, CPsV-B)	P4	P4	Index on sweet orange or Dweet Tangor
Infectious variegation Leaf rugose Crinkly leaf	*Citrus variegation virus* *Citrus leaf rugose virus* *Citrus crinkly leaf virus*	P5 (FL)	Ab1	Index on lemon (eureka) seedlings, sour orange and citron.
Leprosis	*Citrus leprosis virus* (CiLV) Nuclear type (CiLV-N) or cytoplasmatictype (CiLV-C)	Ab3 and Ab7 (FL)	P5, P9 (CHIS, QRO,TAB, VER)	Nuclear: Transmission electron microscopy, Cytoplasmic: RT-PCR
Satsuma dwarf	*Satsuma dwarf virus* (SDV)	Ab1	Ab1	Index on Satsuma mandarin, Tangor Dweet, White sesame (*Sesamum indicum*), ELISA
Tatter leaf-Citrange stunt	*Apple stem grooving virus* (ASGV) syn. Citrus tatter leaf virus (CTLV)	P5 (CA, AZ, TX and FL)	Ab1	Index on Rusk citrange, *Citrus excelsa*.
Leaf blotch and Dweet Mottle	*Citrus leaf blotch virus* (CLBV) and Dweet mottle virus (DMV)	P5 (FL)	Ab1	Index on Dweet tangor, RT-PCR
Yellow mosaic	*Citrus yellow mosaic virus* (CYMV)	Ab1	Ab1	Index on mosambi and satgudi sweet orange or pummelo seedlings, ELISA
	Viroids			
Exocortis	*Citrus exocortis viroid* (CEVd)	P4	P4	Index on Etrog citron Arizona 861-S1
Cachexia, Xyloporosis	*Hop stunt viroid* (HSVd) Citrus variants of HSVd, Citrus viroid IIb (CVd-IIb), Citrus viroid IIc (CVd-IIc)	P4	P4	Etrog citron Arizona 861-S1 for tissue production used in RT-PCR, Imprint Hybridization or indenxing on parson's special grafted on rough lemmon
Various citrus growth abnormalities and symptomatologies related to citrus viroids	*Citrus bent leaf viroid* (CBLVd) *Citrus dwarfing viroid (CDVd)* *Citrus bark cracking viroid* (CBCVd) *Citrus viroid-IIa* (HSVd-Citrus variant) *Citrus viroid V* (CVd-V) *Citrus viroid VI* (CVd-VI)-	P4 P4 P4 P4 P4 Ab1	Ab1 Ab1 Ab1 Ab1 Ab1 Ab1	Index on Etrog citron Arizona 861-S1 and tissue production used in RT-PCR or Imprint Hybridization for HSVd-Citrus variant: CVd-IIa

Disease	Pathogen	Presence/Absence		Accepted Diagnostic Tests
		USA	MEXICO	
	Bacteria			
Citrus Canker	*Xanthomonas citri* subsp *citri* (*ex* Hasse) Gabriel et. al.	P5 (FL)	Ab1	Culturing, ELISA, PCR, bio-assay on Mexican lime or pummelo leaves
Huanglongbing (HLB)	*Candidatus* Liberibacter asiaticus, *C*.L. africanus and *C*.L. americanus	P5 and P9 (*C*. L. asiaticus in CA, FL, LA, SC, GA, PR, TX, USVI)	P5 (YUC, QROO NAY, JAL, COL, SIN, MICH, CHIS, CAMP, BCS, HGO	Index on sweet orange seedling, qPCR, PCR, Hybridization (DNA)
Citrus variegated chlorosis (CVC)	*Xylella fastidiosa* subsp. *pauca* (Wells *et al*.) (CVC Strain)	Ab1	Ab1	PCR + sequencing and culturing
	Mollicutes			
Stubborn	*Spiroplasma citri (*Saglio *et al.*)	P5 (CA,AZ)	Ab1	Culture
Witches'-broom Disease of lime	*Candidatus* Phytoplasma aurantifolia (Zreik *et al*.)	Ab1	Ab1	Indexing on Mexican Lime, PCR
	Fungi			
	Uncharacterized-Unknown			
Black spot	*Guignardia citricarpa* Kiely	P5 y P9 (FL)	Ab1	PCR, culture
Sweet orange scab	*Elsinoë australis* Bitanc. & Jenkins	P5 y P9 (TX, AZ, MS, LA, FL)	Ab1	PCR
Citrus chlorotic dwarf	Uncharacterized, probable virus	Ab1	Ab1	Indexing on rough lemon
Sudden death	Unknown, probable Tymovirus (Citrus sudden death-associated virus) Other viruses possibly associated	Ab1	Ab1	No accepted diagnostic test. For Tymovirus: PCR
Australian dieback	Uncharacterized, probably phytoplasma	Ab1	Ab1	Index on sweet orange or pummelo, PCR

Vein enation-woody gall	Unknown, probable Luteovirus	P5 (CA)	Ab1	Index on Mexican lime, sour orange
Gummy bark	Unknown, probable CVd-IIc variant	Ab1	Ab1	Index on sweet orange
Blight	Unknown	P5 (FL)	P5 (YUC)	No accepted diagnostic test. Dot immunobinding assay (DIBA)
Concave gum	Unknown, presumed virus-like	P5 (CA)	Ab5	Index on Dweet tangor or sweet orange seedlings
Cristacortis	Unknown, presumed virus-like	Ab1	Ab1	Index on sweet orange or Orlando tangelo
Impietratura	Unknown, presumed virus-like	Ab1	Ab1	Index on sweet orange Dweet tangor
Wood pocket	Probably genetic disorder on Persian lime	P11 (CA,FL)	P4	Field symptoms

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Appendix 2: Regulated insects, mites and nematodes associated with citrus propagative material presence or absence in citrus producing NAPPO member countries and accepted identification tests. Insects, mites and nematodes status is determined by each NPPO.

Presence or absence, unless otherwise noted, conforms to the categories listed in ISPM 8: 1998. For ease of reference alpha-numeric designations have been added here.

Ab1: Absent: no pest records
Ab2: Absent: pest eradicated
Ab3: Absent: pest no longer present
Ab4: Absent: pest records invalid
Ab5: Absent: pest records unreliable
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P6: Present: only in protected cultivation
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P8 Present: but managed
P9 Present: subject to official control
P10: Present: under eradication
P11: Present: at low prevalence.
P12: Present: not associated with host crop (NAPPO category)

Scientific name	Common Name Mx	Common name US	Family	US	Regulated in US	Mexico	Regulated in Mexico	Diagnostic
Panonychus citri (McGregor)	Ácaro de los cítricos	Citrus red mite	Tetranychidae	P4	NO	P5 (MOR, PUE, VER)	NO	Microscopic analysis
Polyphagotarso-nemus latus (Banks)	Ácaro amarillo	Broad mite	Tarsonemidae	P4	NO	P12	YES[1]	Microscopic analysis
Tetranychus cinnabarinus (Boisduval)	Araña roja	Carmine spider mite	Tetranychidae	P4	NO	P4	NO	Microscopic analysis

Tetranychus urticae (Koch)	Acaro común	Twospotted mite	Tetranychidae	P4	NO	P4	YES[2]	Microscopic analysis
Eotetranychus sexmaculatus (Riley)	Ácaro de los seis puntos	Sixspotted mite	Tetranychidae	P4 (AZ, CA, FL, TX)	NO[17]	Ab1	NO	Microscopic analysis
Ferrisia virgata (Cockerell)	Cochinilla enbandada	striped mealybug	Pseudococcidae	P2 (FL, LA, MD, MS, NM, PA, TX)	NO	P4	NO	Microscopic analysis
Maconellicocus hirsutus (Green)	Cochinilla rosada	Pink hibiscus mealybug	Pseudococcidae	P2 (CA, FL, HI, LA, TX) and P9 (FL)	YES	P2 and P9 (BC, CHIS, COL, NAY, JAL, Q. ROO, OAX, SIN, YUC)	YES[3]	Microscopic analysis

Planococcus citri (Risso)	Cochinilla harinosa de los cítricos	Citrus mealybug	Pseudococcidae	P5 (FL, CA, AZ)	NO	P5 (VER, NL)	YES[4]	Microscopic analysis
Pseudococcus longispinus (Targioni Tozzetti)	Chinche harinosa	Long-tailed mealybug	Pseudococcidae	P5 (AZ, CA, FL, TX)	NO	P5 (NAY)	YES[5]	Microscopic analysis
Aonidiella aurantii (Maskell)	Escama roja de California	California red scale	Diaspididae	P5 (AZ, CA, FL, TX)	NO	P2	NO	Microscopic analysis
Aonidiella citrina (Coquillet)	Escama amarilla de los cítricos	Yellow scale	Diaspididae	P2 (CA, FL, TX)	NO	P2	NO	Microscopic analysis
Icerya purchasi (Maskell)	Escama algodonosa de los cítricos	Cottony cushion scale	Margarodidae	P5	NO	P2	NO	Microscopic analysis

Scientific name	Common Name Mx	Common name US	Family	US	Regulated in US	Mexico	Regulated in Mexico	Diagnostic
Coccus hesperidum Linnaeus	Escama parda blanca	Brown soft scale	Coccidae	P5	NO	P2	YES[6]	Microscopic analysis
Scirtothrips citri (Moulton)	Thrips del naranjo	Citrus thrips	Thripidae	P4 (CA, AZ) and P5 (FL)	NO[17]	P2 NL, SON, TAM)	NO	Microscopic analysis
Toxoptera citricida (Kirkaldy)	Pulgón café de los cítricos	Brown citrus aphid	Aphididae	P5 (FL, HI)	YES[18]	P5 and P9 (CAMP, CHIS, HGO, OAX, PUE, GRO, Q. ROO, SLP, TAB, VER, YUC, QRO)	YES[7]	Microscopic analysis
Tylenchulus semipenetrans (Cobb)	Nematodo de los cítricos	Citrus nematode	Tylenchidae	P5 (AZ, CA, FL, HI, LA, TX)	NO	P4	NO	Microscopic analysis
Radopholus similis (Siddiqi)	Nematodo barrenador	Burrowing nematodes	Pratylenchidae	P5 (FL, HI, LA, TX)	YES	P5 (CHIS, TAB)	YES[8]	Microscopic analysis
Xiphinema americanum (Cobb)	Nematodo daga Americano	Dagger nematode	Longidoridae	P5 (CA)	NO	P1	NO	Microscopic analysis
Xiphinema index (Thorne & Allen)	Nematodo daga vector de virus en viñedos	Dagger nematode	Longidoridae	P5 (CA)	NO	Ab1	YES[9]	Microscopic analysis
Diaphorina citri Kuwayama	Psílido asiático de los cítricos	Asian citrus psyllid	Psyllidae	P5 and P9 (AL, AZ, CA, FL, GA, GU, HI, LA, MS, PR, SC, TX, ASI, NMI, USVI)	YES[19]	P4	YES[10]	Microscopic analysis
Trioza erytreae (Del Guercio)	Psílidos africano de los cítricos	African citrus psyllid	Psyllidae	Ab1	YES	Ab1	NO	Microscopic analysis

Brevipalpus phoenicis (Geijskes)	Ácaro	Red & Black Flat Mite	Tenuipalpidae	P4	NO	P4	NO	Microscopic analysis
Brevipalpus obovatus Donnadieu	Ácaro	Privet Mite	Tenuipalpidae	P4	NO	P4	NO	Microscopic analysis
Brevipalpus californicus (Banks)	Ácaro	Citrus Flat Mite	Tenuipalpidae	P4	NO	P4	YES[11]	Microscopic analysis
Marmara gulosa Guillen and Davis	Minador de la cascara	Peel miner	Gracillariidae	P5, AZ, CA, TX, FL	NO[17]	Ab1	YES[12]	Microscopic analysis
Phyllocnistis citrella Stainton	Minador citrella	Citrus leaf miner	Gracillariidae	P5	YES	P4	YES[13]	Microscopic analysis
Eutetranychus banksi (McGregor)	Acaro del plateado	Texas Citrus Mite	Tetranychidae	P1	NO	Ab1	NO	Microscopic analysis
Aceria sheldoni (Erwing)	Acaro de las yemas de los cítricos	Citus Bud Mite	Eriophyidae	P4, HI, FL, CA	NO[17]	Ab1	YES[14]	Microscopic analysis
Aculops pelekassi (Keifer)	Acaro rosa de los cítricos	Pink Citrus Rust Mite	Tenuipalpidae	P4 FL		Ab1	NO	Microscopic analysis
Phyllocoptruta oleivora (Ashmead)	Acaro del tostado de los cítricos	Citrus Rust Mite	Eriophyidae	P4	NO	P2 (TAM)	NO	Microscopic analysis
Eutetranychus orientalis (Klein)	Acaro marrón de los Cítricos	Citrus Brown Mite	Tetranychidae	Ab1	YES	Ab1	YES[15]	Microscopic analysis
Diaprepes abbreviatus (L.)	Picudo de la raíz de los cítricos	*Diaprepes weevil*	Curculionidae	P4 FL, TX, CA	YES[20]	Ab1	YES[16]	Microscopic analysis
Pachanaeus litus Germar	Picudo verde azul de los cítricos	Citrus root weevil	Curculionidae	P4 FL (native)	NO[17]	Ab1	NO	Microscopic analysis
Myllocerus undecimpustulatus undatus Marshall	Picudo negro asiático	none	Curculionidae	P5 FL	YES[20]	Ab1	NO	Microscopic analysis