Importation, from Mexico into the United States, of Potato, *Solanum tuberosum*, Tubers Intended for Consumption

A Pathway-initiated Commodity Risk Assessment

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Executive Summary

In this document we present results of an assessment of the risks associated with the importation, from Mexico into the United States (the 50 states and Caribbean territories), of ware potatoes (i.e., potatoes for consumption only), *Solanum tuberosum* L. A search of available sources of information and APHIS, PPQ port interception records identified eight quarantine pests of *S. tuberosum* that occur in Mexico and could be introduced into the United States in consignments of that commodity.

Consequences of Introduction were estimated by assessing five elements that reflect the biology and ecology of the pests: climate/host interaction, host range, dispersal potential, economic impact, and environmental impact, resulting in the calculation of a risk value. *Likelihood of Introduction* was estimated by considering both the quantity of the commodity to be imported annually and the potential for pest introduction, resulting in the calculation of a second risk value. The two values were summed to estimate an overall *Pest Risk Potential*, which is an estimation of risk in the absence of mitigation.

Quarantine pests considered likely to follow the import pathway are presented in the following table, indicating their risk ratings.

Estimated risks associated with the introduction of quarantine pests of potato from Mexico.

Pest	**Consequences of Introduction**	**Likelihood of Introduction**	**Pest Risk Potential**
Epicaerus cognatus Sharp	Medium	Medium	Medium
Copitarsia decolora (Guenée)	High	Medium	Medium
Ralstonia solanacearum race 3 (Smith) Yabuuchi et al.	High	High	High
Rosellinia bunodes (Berk. & Broome) Sacc.	High	Low	Medium
Rosellinia pepo Pat.	Medium	Low	Medium
Synchytrium endobioticum (Schilb.) Percival	High	Medium	High
Thecaphora solani (Thirum. & O'Brien) Mordue	Medium	Low	Medium
Nacobbus aberrans (Thorne) Thorne & Allen	High	High	High

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1. Introduction

1.1. Background

This document was prepared by the Plant Epidemiology and Risk Analysis Laboratory of the Center for Plant Health Science and Technology, USDA Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ), in response to a request to evaluate the risks associated with the importation of commercially produced fresh tubers of potato, *Solanum tuberosum* L., for consumption, from Mexico into the United States (including the 50 states and Caribbean territories).

The International Plant Protection Convention (IPPC) provides guidance for conducting pest risk analyses. The methods used here are consistent with guidelines provided by the IPPC, specifically the International Standard for Phytosanitary Measures (ISPM) on 'Pest Risk Analysis for Quarantine Pests, Including Analysis of Environmental Risks and Living Modified Organisms' (IPPC, 2009: ISPM #11). The use of biological and phytosanitary terms is consistent with the 'Glossary of Phytosanitary Terms and the Compendium of Phytosanitary Terms' (IPPC, 2009: ISPM #5).

Three stages of pest risk analysis are described in international standards: Stage 1, Initiation, Stage 2, Risk Assessment, and Stage 3, Risk Management. This document satisfies the requirements of Stages 1 and 2.

This is a qualitative risk analysis; estimates of risk are expressed in terms of High, Medium, and Low pest risk potentials based on the combined ratings for specified risk elements (PPQ, 2000) related to the probability and consequences of importing this ware potatoes commodity from Mexico. For the purposes of this assessment High, Medium, and Low probabilities will be defined as:

High: More likely to occur than not to occur
Medium: As likely to occur as not to occur
Low: Less likely to occur than not to occur

The appropriate risk management strategy for a particular pest depends on the risk posed by that pest. Identification of appropriate sanitary and phytosanitary measures to mitigate the risk, if any, for this pest is undertaken as part of Stage 3 (Risk Management). Other than listing possible mitigation options for the pests of concern, we did not discuss risk management in this document.

1.2. Commodity Information

Potatoes are grown on about 70,000 ha in Mexico, primarily in the states of Chihuahua, Coahuila, Guanajuato, México, Michoacán, Nuevo León, Sinaloa, Sonora, Tlaxcala, and Veracruz (Haverkort & Wiersema, 2007) (Fig. 1). Production in 2008 exceeded 1.6 million tonnes (FAO, 2011b), at a producer price of about $422 per tonne (FAO, 2011a). Mexico ranks 33rd in global potato production (NPC, 2011b).

Potato production in the United States in 2009 was approximately 19.5 million tonnes, at a producer price of about $180 per tonne (NASS, 2010). The United States is the world's fifth largest potato producer (NPC, 2011b).

Figure 1. Map of Mexico showing states (red dots), in which potatoes are produced (source: http://www.planetware.com/map/mexico-mexico-mexican-states-map-mex-mex1.htm).

2. Risk Assessment

2.1. Initiating Event: Proposed Action

This risk assessment was developed in response to a request, by the government of Mexico in 2001 (Hernandez, 2001), for USDA authorization to permit imports of fresh ware potato tubers (for consumption) from Mexico into the United States. Entry of this commodity into the United States presents the risk of introduction of exotic plant pests. Title 7, Part 319, Section 56 of the United States Code of Federal Regulations (7 CFR §319.56) provides regulatory authority for the importation of fruits and vegetables from foreign countries into the United States.

2.2. Assessment of the Weed Potential of Potato (*Solanum tuberosum* L.)

This step examines the potential of the commodity to become a weed after it enters the United States (Table 1; USDA, 2000). If the assessment indicates significant weed potential, then a "pest-initiated" risk assessment is conducted.

Table 1. Assessment of the weed potential of potato.

Commodity: Potato (*Solanum tuberosum* L.) (Solanaceae)

Phase 1: Potato is naturalized in all 50 states and the territory of Puerto Rico (ERS, 2007; USDA-NRCS, 2011). The crop is grown commercially in 36 states (NPC, 2011a).

Phase 2: Is the species listed in:

- Yes — *A Geographical Atlas of World Weeds* (Holm et al., 1979)
- No — *The World's Worst Weeds* (Holm et al., 1977) or *World Weeds: Natural Histories and Distribution* (Holm et al., 1997)
- No — 1982 Report of the Technical Committee to Evaluate Noxious Weeds: Exotic Weeds for Federal Noxious Weed Act (Gunn & Ritchie, 1982)
- No — *Economically Important Foreign Weeds* (Reed, 1977)
- No — Weed Science Society of America Composite List of Weeds (WSSA, 2010)
- Yes — Is there any literature reference or database indicating weediness (e.g., AGRICOLA, CAB Abstracts, Biological Abstracts; search on "species name" combined with "weed")

Phase 3: *Solanum tuberosum* is listed by Holm et al. (1979) as a common weed in Finland and as present as a weed in India, Turkey, and the United States. Randall (2002) categorized *S. tuberosum* as a weed with the following statuses: *weed*, *naturalised*, *cultivation escape*, *casual alien*. However, the species is well established and widespread in the United States, where it has long been grown commercially (Kehr et al., 1964). Importation of fresh tubers from Mexico is unlikely to increase the plant's weed potential beyond that existing at present. A pest-initiated risk assessment therefore is not necessary.

2.3. Previous Risk Assessments, Current Status, and Pest Interceptions

2.3.1. Previous Risk Assessment

2002 – The Importation, from Mexico into the Continental United States, of Greenhouse-Grown Mini-tuber Potato, *Solanum tuberosum* L., Intended for Propagation (June 28, 2002). Qualitative, Pathway-initiated Risk Assessment. USDA-APHIS, PPQ, CPHST, PERAL.

2.3.2. Decision History for *Solanum tuberosum* from Central and South America

1971 – Deny entry from Nicaragua, as "[n]either entomology nor pathology findings support a relaxation of the Potato Regulations as they apply to Nicaragua."

1971 – Deny entry from Colombia since "[p]otatoes are restricted entry under the Potato Regulations and have never been approved from Colombia. The above pests [listed on the decision sheet] provide ample justification for retaining this position."

Currently, potato tuber imports from Mexico are not authorized by 7 CFR §319.56. Pest interceptions at U.S. ports-of-entry on *Solanum tuberosum* from Mexico are summarized below (Table 2).

Table 2. U.S. port interceptions on *Solanum tuberosum* from Mexico (1984-2011).[1]

Organism	Plant Part Infested	Location of Interception	Purpose	Interceptions (no.)
ACARI				
Cryptostigmata, species of	Fruit	Baggage	Consumption	1
Oribatulidae				
Oribatulidae, species of	Root	Baggage	Consumption	1
ARANEAE				
Araneae, species of	No data	Baggage	Consumption	1
INSECTA				
Insecta, species of	Leaf	Permit cargo	Consumption	1
COLEOPTERA				
Anthicidae				
Anthicidae, species of	No data	Baggage	Consumption	1
Chrysomelidae				
Chrysomelidae, species of	Stem	Baggage	Consumption	1
	Root	Baggage	Consumption	1
	No data	Baggage	Consumption	1
Epitrix sp.	Stem	Baggage	Consumption	1
Galerucella sp.	Root	Baggage	Consumption	1
Curculionidae				
Colecerus sp.	Stem	Baggage	Consumption	1
Conotrachelus sp.	Stem	Baggage	Consumption	4
Copturus sp.	Stem	Baggage	Consumption	2
Curculionidae, species of	Fruit	Baggage	Consumption	1
	Root	Baggage	Consumption	2
		Stores	Non-entry	1
	Stem	Baggage	Consumption	6
		General cargo	Consumption	1
Cylindrocopturus sp.	Root	Baggage	Consumption	1
Diaprepes sp.	Root	Baggage	Non-entry	1
Epicaerus sp.	Bulb[2]	Baggage	Consumption	5
	Fruit	Baggage	Consumption	7
		Stores	Consumption	1
	Root	Baggage	Consumption	14
		Quarters	Non-entry	1
	Stem	Baggage	Consumption	39
	No data	Baggage	Consumption	49
Epicaerus cognatus Sharp	Root	Baggage	Consumption	1

Organism	Plant Part Infested	Location of Interception	Purpose	Interceptions (no.)
Premnotrypes sp.	Root	Baggage	Consumption	1
Rhynchophorinae, species of	Stem	Baggage	Consumption	1
Sitophilus sp.	Root	Baggage	Consumption	1
Sphenophorus sp.	Root	Baggage	Consumption	1
	No data	Baggage	Consumption	1
Trichobaris sp.	Stem	Baggage	Consumption	1
Elateridae				
Conoderus laurenti (Guérin)	Stem	Baggage	Consumption	1
Scarabaeidae				
Diplotaxis sp.	Root	Baggage	Consumption	1
Tenebrionidae				
Blapstinus sp.	Root	Baggage	Consumption	1
Epitragus sp.	Stem	Baggage	Consumption	2
DERMAPTERA				
Dermaptera, species of	Fruit	Baggage	Consumption	1
Forficulidae				
Forficulidae, species of	No data	Baggage	Consumption	1
DIPTERA				
Diptera, species of	Root	Baggage	Consumption	1
Agromyzidae				
Agromyzidae, species of	Leaf	Permit cargo	Consumption	3
Ceratopogonidae				
Ceratopogonidae, species of	Root	Baggage	Consumption	1
	No data	Baggage	Consumption	1
Drosophilidae				
Drosophilidae, species of	Bulb[2]	Miscellaneous	Consumption	1
Muscidae				
Musca sp.	No data	Baggage	Consumption	1
Mycetophilidae				
Mycetophilidae, species of	Fruit	Baggage	Consumption	1
Phoridae				
Phoridae, species of	Fruit	Baggage	Consumption	1
Syrphidae				
Syrphidae, species of	Stem	Baggage	Consumption	1
	No data	Baggage	Consumption	1
Tephritidae				
Tephritidae, species of	Root	Baggage	Consumption	1
HEMIPTERA				
Aphididae				
Aphididae, species of	Plant	Baggage	Propagation	1
Largidae				
Largus cinctus Herrich-Schäffer	Stem	Baggage	Consumption	1

Organism	Plant Part Infested	Location of Interception	Purpose	Interceptions (no.)
Lygaeidae				
Prytanes sp.	Root	Baggage	Consumption	1
Pentatomidae				
Euschistus sp.	Fruit	Baggage	Consumption	1
Pseudococcidae				
Planococcus citri (Risso)	Root	Baggage	Consumption	1
Planococcus sp.				Fruit
HYMENOPTERA				
Formicidae				
Camponotus sp.	Stem	Baggage	Consumption	1
Solenopsis geminata (F.)	Fruit	Baggage	Consumption	1
LEPIDOPTERA				
Lepidoptera, species of	Root	Baggage	Consumption	1
Gelechiidae				
Gelechiidae, species of	Root	Baggage	Consumption	5
		Stores	Non-entry	1
	Stem	Baggage	Consumption	1
Phthorimaea operculella (Zeller)	Fruit	Baggage	Consumption	3
	Root	Baggage	Consumption	1
	Stem	Baggage	Consumption	3
	No data	Baggage	Consumption	7
Noctuidae				
Noctuidae, species of	Fruit	Baggage	Consumption	1
Oecophoridae				
Oecophoridae, species of	Stem	Baggage	Consumption	1
Sesiidae				
Sesiidae, species of	Stem	Baggage	Consumption	1
Tortricidae				
Tortricidae, species of	Root	Baggage	Consumption	2
ORTHOPTERA				
Gryllidae				
Acheta domesticus (L.)	Root	Miscellaneous	Non-entry	1
BACTERIUM				
Streptomyces scabies (Thaxt.) Waksman & Henrici	Bulb[2]	Baggage	Consumption	1
	Fruit	Baggage	Consumption	9
	Root	Baggage	Consumption	7
	Stem	Baggage	Consumption	4
	No data	Baggage	Consumption	8
FUNGI				
Aspergillus sp.	Fruit	Baggage	Consumption	1
	Root	Baggage	Consumption	1
Cladosporium sp.	Root	Baggage	Consumption	3

Organism	Plant Part Infested	Location of Interception	Purpose	Interceptions (no.)
	Stem	Baggage	Consumption	2
		Miscellaneous	Consumption	1
Coniothyrium sp.	Root	Baggage	Consumption	1
Fusarium sp.	Root	Baggage	Consumption	1
	Stem	Baggage	Consumption	1
Fusarium solani (Mart.) Sacc.	No data	Baggage	Consumption	1
Microsphaeropsis sp.	Stem	Baggage	Consumption	1
Phoma sp.	Leaf	Mail	Consumption	1
	Stem	Baggage	Consumption	1
Rhizoctonia solani Kühn	Fruit	Baggage	Consumption	8
	Root	Baggage	Consumption	11
	No data	Baggage	Consumption	5
Spongospora solani Brunchorst	Fruit	Baggage	Consumption	5
	Root	Baggage	Consumption	4
	No data	Baggage	Consumption	2
Spongospora subterranea (Wallroth) Lagerheim	Fruit	Baggage	Consumption	1
	Root	Baggage	Consumption	1
	No data	Baggage	Consumption	1
Thecaphora solani (Thirum. & O'Brien) Mordue	Bulb[2]	Baggage	Consumption	2
	Fruit	Baggage	Consumption	1
	Plant	Baggage	Consumption	1
	Root	Baggage	Consumption	9
	Stem	Baggage	Consumption	7
	No data	Baggage	Consumption	46
NEMATODA				
Cactodera sp.	Stem	Baggage	Consumption	1

[1]Records from the USDA-APHIS Agricultural Quarantine Activity Systems Pest Interception Database (Pest ID). Last access: February 2011.
[2]May refer to the potato tuber. Bulb crops comprise members of the Liliaceae, particularly species of *Allium* (Tsao & Lo, 2004).

2.4. Pest Categorization—Identification of Quarantine Pests and Quarantine Pests Likely to Follow the Pathway

Pests and potential pests associated with potato, that also occur in Mexico, are listed below (Table 3). The list includes information on the presence or absence of the pest in the United States, the affected plant part or parts, the quarantine status of the pest with respect to the United States, an indication of the pest-commodity association, and pertinent references for pest distribution and biology.

Pests in shaded rows are quarantine pests likely to follow the pathway and selected for further analysis.

Table 3. Pests and potential pests in Mexico associated with potato (*Solanum tuberosum* L.).[1]

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
ARTHROPODS					
ACARI					
Acaridae					
Rhizoglyphus robini Claparède	MX, US	R, S	No	No	Fan & Zhang (2003)
Eriophyidae					
Aculops lycopersici (Tryon)	MX, US	L, S	No	No	CABI (2011); Jeppson et al. (1975)
Tetranychidae					
Bryobia praetiosa Koch	MX, US	L	No	No	Bolland et al. (1998); Jeppson et al. (1975)
Tetranychus cinnabarinus (Boisduval)	MX, US	L	No	No	CABI (2011)
Tetranychus desertorum Banks	MX, US	L	No	No	Bolland et al. (1998); Estébanes & Baker (1966)
Tetranychus ludeni Zacher	MX, US	L	No	No	Jeppson et al. (1975)
Tetranychus marianae McGregor	MX, US	L, S	No	No	CABI (2011); Denmark (1970)
Tetranychus urticae Koch (= *T. telarius* L.)	MX, US	L	No	No	CABI (2011); Schubert (1967)
BLATODEA					
Blaberidae					
Pycnoscelus surinamensis (L.)	MX, US	S	No	No	Bruner et al. (1945); Palacios & Jiménez (1997); Suiter & Koehler (2003)
INSECTA					
Coleoptera: Anthribidae					
Araecerus fasciculatus (De Geer)	MX, US	T	No	No[5]	CABI (2011); Mphuru (1974)
Coleoptera:Chrysomelidae					
Acalymma trivittatum (Mannerheim)	MX, US	L, S	No	No	Capinera (2001); MacGregor & Gutiérrez (1983); Metcalf & Metcalf (1993)
Acalymma vittatum (F.) (= *Diabrotica melanocephala* [F.])	MX, US	I, L, S	No	No	CABI (2011); MAF (2004)
Agroiconota bivittata (Say)	MX, US	L	No	No	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Altica amethystina (Olivier)	MX	L	Yes	No	King & Saunders (1984)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Cerotoma atrofasciata Jacoby	MX, US	L	No	No	Gámez-Virués & Eben (2005); MAF (2004); Riley et al. (2003)
Cerotoma ruficornis (Olivier)	MX	L	Yes	No	CABI (2011); Kost & Heil (2006)
Chaetocnema confinis Crotch	MX, US	L	No	No	CABI (2011); Lingafelter (2001)
Chaetocnema pulicaria Melsheimer	MX, US	L	No	No	Capinera (2001); Clark et al. (2004); Elliot (1938)
Charidotella (= *Coptocycla*, *Metriona*) *bicolor* (F.)	MX, US	L	No	No	Britton (1918); CABI (2011); Rausher & Simms (1989)
Charidotella sexpunctata (F.)	MX, US	L	No	No	Clark et al. (2004); Harris (2005); Riley et al. (2003)
Colaspis hesperia Blake	MX, US	L[6]	No	No	Clark et al. (2004); Riley et al. (2003)
Cyclotrypema furcata (Olivier)	MX, US	I, L, R[7]	No	No	Clark et al. (2004); Riley et al. (2003)
Deloyala guttata (Olivier)	MX, US	L	No	No	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Diabrotica sp.	MX	I, L, R[7]	Yes	No	McGuire & Crandall (1967)
Diabrotica adelpha Harold	MX	I, L	Yes	No	King & Saunders (1984)
Diabrotica balteata LeConte	MX, US	I, L, R, S, T	No	No[8]	CABI (2011); Mayea & Mendez (1980); Rodriguez-del-Bosque & Magallanes-Estala (1994)
Diabrotica nummularis Harold	MX	L	Yes	No	King & Saunders (1984)
Diabrotica porracea Harold	MX	L	Yes	No	King & Saunders (1984)
Diabrotica tibialis Jacoby	MX, US	I, L, R[7]	No	No	Branson & Krysan (1987); MAF (2004)
Diabrotica undecimpunctata Mannerheim (= *D. duodecimpunctata* [F.])	MX, US	I, L	No	No	EPPO (2011); MacGregor & Gutiérrez (1983); McGuire & Crandall (1967); Riley et al. (2003)
Diabrotica virgifera LeConte	MX, US	L, R	No	No	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Diachus auratus (F.)	MX, US	I, L	No	No	Clark et al. (2004); Riley et al. (2003); Wood & Knowlton (1949)
Diphaulaca wagneri Harold	MX	L	Yes	No	King & Saunders (1984)
Disonycha arizonae Casey	MX, US	L[9]	No	No	Clark et al. (2004); Riley et al. (2003)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Disonycha collata (F.)	MX, US	L	No	No	Clark et al. (2004); El Aydam & Bürki (1997); Riley et al. (2003)
Disonycha glabrata (F.)	MX, US	L, R	No	No	Clark et al. (2004); El Aydam & Bürki (1997); Riley et al. (2003)
Epitrix sp.	MX	S	Yes	No	PestID (2011)
Epitrix cucumeris (Harris)	MX, US	L, R, T	No	Yes	CABI (2011); Capinera (2001); Lingafelter (2001)
Epitrix fasciata Blatchley (= *E. parvula* [F.])	MX, US	L	No	No	CABI (2011); Lingafelter (2001); Mayea & Mendez (1980); Bruner et al. (1945)
Epitrix hirtipennis (Melsheimer)	MX, US	L	No	No	CABI (2011); Lingafelter (2001); Webb (2006)
Epitrix subcrinita (LeConte)	MX, US	L, R, T	No	Yes	Capinera (2001); McGuire & Crandall (1967)
Galerucella sp.	MX	R	Yes	No	PestID (2011)
Glyptina cerina (LeConte)	MX, US	L[9]	No	No	Clark et al. (2004); Riley et al. (2003)
Gratiana pallidula (Boheman)	MX, US	L	No	No	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Lema daturaphila Kogan & Goeden (= *L. trilinea* White, *L. trilineata* [Oliver])	MX, US	L	No	No	Anonymous (2007); Clark et al. (2004); Fornoni et al. (2003); Riley et al. (2003)
Lema nigrovittata (Guérin-Méneville)	MX, US	L	No	No	Clark et al. (2004); Pallister (1953); Riley et al. (2003)
Lema opulenta Gemminger & Harold	MX, US	L[11]	No	No	Clark et al. (2004); Riley et al. (2003)
Lema trivittata Say	MX, US	L	No	No	Anonymous ([s.d.]); Clark et al. (2004); Riley et al. (2003)
Leptinotarsa decemlineata (Say)	MX, US	L	No	No	CABI (2011)
Leptinotarsa defecta (Stål)	MX, US	L	No	No	Clark et al. (2004); Cuda et al. (2002); Riley et al. (2003)
Leptinotarsa haldemani (Rogers)	MX, US	L	No	No	Clark et al. (2004); Haley Sperling & Mitchell (1991); Riley et al. (2003)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Leptinotarsa lineolata (Stål)	MX, US	L[12]	No	No[13]	Clark et al. (2004); Riley et al. (2003)
Leptinotarsa rubiginosa (Rogers)	MX, US	L[12]	No	No	Clark et al. (2004); Riley et al. (2003)
Leptinotarsa texana Schaeffer	MX, US	L	No	No	Clark et al. (2004); Cuda et al. (2002); Riley et al. (2003)
Leptinotarsa undecimlineata (Stål)	MX	L	Yes	No	Cañas et al., 2002; Clark et al. (2004); Riley et al. (2003)
Myochrous cyphus Blake	MX, US	L, S[14]	No	No	Clark et al. (2004); Riley et al. (2003)
Omophoita cyanipennis (F.)	MX, US	L[15]	No	No	Clark et al. (2004); Riley et al. (2003)
Orsodacne atra (Ahrens)	MX, US	I	No	No	Clark et al. (2004); Cripps et al. (2006); Kevan et al. (1993); Riley et al. (2003)
Phyllotreta albionica (LeConte)	MX, US	L	No	No	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Phyllotreta pusilla Horn	MX, US	L, R	No	No	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Plagiometriona clavata (F.)	MX, US	L	No	No	McGuire & Crandall (1967); Vencl et al. (1999); Woodruff (2010)
Psylliodes punctulatus Melsheimer	MX, US	L	No	No	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Sumitrosis inaequalis (Weber)	MX, US	L	No	No[16]	Clark et al. (2004); Riley et al. (2003)
Systena blanda Melsheimer	MX, US	L, R	No	No	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Systena s-littera (L.)	MX	L	Yes	No	King & Saunders (1984)
Typophorus nigritus (F.)	MX, US	L, R, S, T	No	Yes	Capinera (2001); Clark et al. (2004); Riley et al. (2003)
Coleoptera: Coccinellidae					
Epilachna varivestis Mulsant	MX, US	L, S	No	No	CABI (2011); Kogan (1977)
Coleoptera: Curculionidae					
Anthonomus baridioides Champion	MX	L	Yes	No	García (1974); Matienzo et al. (2003)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Anthonomus eugenii Cano	MX, US	L	No	No	CABI (2011); Elmore (1942)
Colecerus sp.	MX	S	Yes	No	PestID (2011)
Collabismodes rhombifer (Champion)	MX	S	Yes	No	Gordón et al. (1988); King & Saunders (1984)
Collabismodes subparallelus (Champion)	MX	S	Yes	No	King & Saunders (1984)
Conotrachelus sp.	MX	S	Yes	No	PestID (2011)
Copturus sp.	MX	S	Yes	No	PestID (2011)
Cylas formicarius F.	MX, US	L, R, S	No	No[17]	CABI (2011); PestID (2011)
Cylindrocopturus sp.	MX	R	Yes	No	PestID (2011)
Diaprepes sp.	MX	R	Yes	No	PestID (2011)
Epicaerus sp.	MX	F, R, S	Yes	No	PestID (2011)
Epicaerus cognatus Sharp	MX	L, T	Yes	Yes	Anonymous (1959); CABI (2011)
Hypera postica (Gyllenhal)	MX, US	L	No	No	CABI (2011)
Pantomorus cervinus (Boheman)	MX, US	L	No	No	CABI (2011)
Phyrdenus muriceus (Germar)	MX, US	L, R, S, T	No	Yes	McGuire & Crandall (1967); Novo et al. (2002); O'Brien & Wibmer (1982)
Premnotrypes sp.	MX	R	Yes	No	PestID (2011)
Sphenophorus sp.	MX	R	Yes	No	PestID (2011)
Trichobaris sp.	MX	S	Yes	No	PestID (2011)
Trichobaris mucorea (LeConte)	MX, US	S	No	No	Morrill (1927); O'Brien & Wibmer (1982)
Trichobaris trinotata (Say)	MX, US	S	No	No	CABI (2011); Hill (1987); Rodríguez & Rodríguez (1984)
Coleoptera: Elateridae					
Conoderus amplicollis (Gyllenhal)	MX, US	T	No	Yes	Jansson & Lecrone (1989); Stone & Wilcox (1979)
Conoderus laurenti (Guérin)	MX	S	No[18]	No	PestID (2011)
Coleoptera: Meloidae					
Epicauta cinerea (Förster)	MX, US	L	No	No	Capinera (2001); Chapais (1913); McGuire & Crandall (1967)
Epicauta corvina (LeConte)	MX, US	L	No	No	Brisley (1924); McGuire & Crandall (1967); Vaurie (1950)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Epicauta diversicornis (Haag)	MX	L[19]	Yes	No	McGuire & Crandall (1967)
Epicauta longicollis (LeConte)	MX, US	L[19]	No	No	McGuire & Crandall (1967); Vaurie (1950)
Epicauta maculata (Say)	MX, US	L	No	No	Capinera (2001); McGuire & Crandall (1967); Vaurie (1950)
Epicauta pardalis LeConte	MX, US	L[19]	No	No	McGuire & Crandall (1967); Vaurie (1950)
Epicauta vittata (F.)	MX, US	L	No	No	McGuire & Crandall (1967); Selander (1984)
Epicauta vitticollis (Haag)	MX	L[19]	Yes	No	McGuire & Crandall (1967)
Lytta quadrimaculata (Chevrolat)	MX, US	L[19]	No	No	McGuire & Crandall (1967); Vaurie (1950)
Coleoptera: Scarabaeidae					
Anomala flavipennis Burmeister (= *A. kansana* Hayes & McColloch)	MX, US	L, R	No	No	Hayes & McColloch (1924); Rodríguez-del-Bosque et al. (1995); Smith (2003)
Diplotaxis sp.	MX	R	Yes	No	PestID (2011)
Euphoria pulchella (Gory & Percheron)	MX	I	Yes	No	Maes (2004); McGuire & Crandall (1967)
Lachnosterna sp.?	MX	R	Yes	No	De la Rosa (1942)
Phyllophaga spp.	MX	R, T[20]	Yes	No[21]	McGuire & Crandall (1967)
Phyllophaga dentex (Bates)	MX, US	R, T[20]	No	No[21]	Evans (2003); McGuire & Crandall (1967)
Phyllophaga menetriesii (Blanchard)	MX	R	Yes	No	Aragón & Morón (2004); CABI (2011); King (1984)
Phyllophaga obsoleta (Blanchard)	MX, US	L, R, T	No	No[21]	Aragón et al. (2001); Deloya & Valenzuela (1999); Evans (2003)
Phyllophaga setifera (Burmeister)	MX, US	R, T[20]	No	No[21]	Aragón et al. (2001); Evans (2003)
Phyllophaga zunilensis (Bates)	MX	R, T[20]	Yes	No[21]	Evans (2003); King (1984)
Coleoptera: Tenebrionidae					
Alaetrinus (= *Opatrinus*) *pullus* (Sahlberg)	MX, US	R	No	No	Iwan (2002); PestID (2011)
Blapstinus sp.	MX	R	Yes	No	PestID (2011)
Epitragus sp.	MX	S	Yes	No	PestID (2011)
Tribolium castaneum (Herbst)	MX, US	T	No	No[5]	CABI (2011); Sharma et al. (1987)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Coleoptera: Trogossitidae					
Tenebroides mauritanicus (L.)	MX, US	T	No	No[5]	CABI (2011); Sharma et al. (1987)
Diptera: Agromyzidae					
Liriomyza huidobrensis (Blanchard)	MX	L	Yes	No[22]	CABI (2011); Takano et al. (2005)
Liriomyza pusilla (Meigen)	MX, US	L	No	No	MacGregor & Gutiérrez (1983); Wolfenbarger (1958)
Liriomyza sativae Blanchard (= *L. munda* Frick)	MX, US	L	No	No	CABI (2011); McGuire & Crandall (1967)
Liriomyza trifolii (Burgess)	MX, US	L	No	No	CABI (2011)
Diptera: Anthomyiidae					
Delia platura (Meigen) (= *Hylemya cilicrura* [Rondani], *H. platura* [Meigen])	MX, US	R, T	No	Yes	CABI (2011); MacGregor & Gutiérrez (1983); Munro (1954)
Pegomya hyoscyami (Panzer)	MX, US	L	No	No	CABI (2011); Geigenmüller (1970)
Diptera: Tephritidae					
Neotephritis finalis (Loew)	MX, US	I	No	No	McGuire & Crandall (1967); Stone et al. (1965); White & Elson-Harris (1992)
Oedicarena latifrons (Wulp)[23]	MX, US	F	No	No	Deloya & Valenzuela (1999); White & Elson-Harris (1992)
Paroxyna spp.	MX	I[24]	Yes	No	García (1974)
Hemiptera: Aleyrodidae					
Aleyrodes sp.	MX	L[29]	Yes	No	McGuire & Crandall (1967)
Aleyrodes spiraeoides Quaintance	MX, US	L	No	No	Evans (2005); Landis & Getzendaner (1947); Ruiz (1993)
Bemisia argentifolii Bellows & Perring (= *B. tabaci* [Gennadius] biotype B)	MX, US	L	No	No	CABI (2011); Simmons & Elsey (1995)
Bemisia tabaci (Gennadius)	MX, US	L	No	No	CABI (2011)
Trialeurodes spp.	MX	L[29]	Yes	No	McGuire & Crandall (1967)
Trialeurodes abutiloneus (Haldeman)	MX, US	L	No	No	Jones (2003); Mound & Halsey (1978)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Trialeurodes vaporariorum (Westwood)	MX, US	L	No	No	CABI (2011)
Hemiptera: Aphididae					
Acyrthosiphon malvae (Mosley)	MX, US	I, L, S	No	No	Blackman & Eastop (2000); Fitter & Peat (1994); Jensen et al. (2008)
Acyrthosiphon pisum (Harris)	MX, US	L	No	No	CABI (2011)
Aphis craccivora Koch	MX, US	L	No	No	CABI (2011)
Aphis fabae Scopoli	MX, US	L, S	No	No	CABI (2011)
Aphis frangulae Kaltenbach	MX, US	L	No	No	Anonymous (2005a); Jensen et al. (2008)
Aphis gossypii Glover	MX, US	L, S	No	No	CABI (2011)
Aphis nasturtii Kaltenbach	MX, US	L	No	No	Anonymous (2005a); Jensen et al. (2008)
Aphis sambuci L.	MX, US	L	No	No	CABI (2011); De Bokx & Piron (1990); Jensen et al. (2008)
Aphis spiraecola Patch	MX, US	L	No	No	CABI (2011)
Aulacorthum circumflexum (Buckton)	MX, US	L	No	No	Blackman & Eastop (2000); Hill (1987); Jensen et al. (2008)
Aulacorthum solani Kaltenbach	MX, US	L	No	No	CABI (2011); Jensen et al. (2008)
Hyalopterus pruni (Geoffroy)	MX, US	L	No	No	CABI (2011); Jensen et al. (2008)
Hyperomyzus lactucae (L.)	MX, US	L	No	No	CABI (2011)
Lipaphis erysimi (Kaltenbach)	MX, US	L	No	No	CABI (2011); Srivastava et al. (1971)
Macrosiphum euphorbiae (Thomas) (= *M. solanifolii* [Ashmead])	MX, US	L	No	No	Blackman & Eastop (2000); CABI (2011); MacGregor & Gutiérrez (1983)
Metopolophium dirhodum (Walker)	MX, US	L	No	No	CABI (2011); Hoof (1980)
Myzus certus (Walker)	MX, US	L	No	No	CABI (2011); Hoof (1980); Jensen et al. (2008)
Myzus ornatus Laing	MX, US	L	No	No	Blackman & Eastop (2000); Jensen et al. (2008); Stufkens & Teulon (2001)
Myzus persicae (Sulzer)	MX, US	L	No	No	CABI (2011)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Rhopalosiphoninus latysiphon (Davidson)	MX, US	R, S, T	No	No[30]	Blackman & Eastop (2000); Gratwick (1989); Jensen et al. (2008)
Rhopalosiphum maidis (Fitch)	MX, US	L	No	No	CABI (2011)
Rhopalosiphum padi (L.)	MX, US	L	No	No	CABI (2011); Rough & Close (1965)
Rhopalosiphum rufiabdominale (Sasaki)	MX, US	R	No	No	CABI (2011)
Sitobion (= *Macrosiphum*) *avenae* (F.)	MX, US	L	No	No	CABI (2011); Shands et al. (1962)
Hemiptera: Asterolecaniidae					
Russellaspis (= *Asterolecanium*) *pustulans* (Cockerell)	MX, US	L, S	No	No	Ben-Dov et al. (2011); Garcia (1999); Hamon (1977)
Hemiptera: Cicadellidae					
Aceratagallia spp.	MX	L[31]	Yes	No	Almeyda-León et al. (2008)
Aceratagallia fuscoscripta Oman	MX, US	L[31]	No	No	McKamey (2001); Ramírez & Ramos-Elorduy (1978)
Aceratagallia sanguinolenta (Provancher)	MX, US	L	No	No	McKamey (2001); Metcalf & Metcalf (1993); Radcliffe & Johnson (1994)
Agallia barretti Ball	MX, US	L[31]	No	No	McKamey (2001); Ramírez & Ramos-Elorduy (1978)
Agallia quadripunctata (Provancher)	MX, US	L[31]	No	No	McKamey (2001); O'Brien & Rich (1979)
Agalliopsis sp.	MX	L[31]	Yes	No	Marín et al. (2009)
Agrosoma placetis Medler	MX	L	Yes	No	Coto & Saunders (2004); King & Saunders (1984)
Carneocephala sp.	MX	L[31]	Yes	No	Marín et al. (2009)
Carneocephala sagittifera (Uhler)	MX, US	L[31]	No	No	Metcalf (1954); Ramírez & Ramos-Elorduy (1978)
Ciminius sidanus (Ball)	MX, US	L[31]	No	No	McKamey (2001); Ramírez & Ramos-Elorduy (1978)
Circulifer tenellus (Baker)	MX, US	L	No	No	McKamey (2001); Munyaneza & Upton (2005)
Draeculacephala crassicornis Van Duzee	MX, US	L	No	No	Dowdy (1947); Ramírez & Ramos-Elorduy (1978)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Draeculacephala minerva Ball	MX, US	L	No	No	Cabrera-La Rosa et al. (2008); Marín et al. (2009)
Draeculacephala portola Ball	MX, US	L[32]	No	No	McGuire & Crandall (1967); McKamey (2001)
Elymana sp.	MX	L[31]	Yes	No	Marín et al. (2009)
Empoasca spp.	MX	L[33]	Yes	No	McGuire & Crandall (1967)
Empoasca abrupta DeLong	MX, US	L	No	No	García (1974); McKamey (2001)
Empoasca fabae (Harris)	MX, US	L	No	No	CABI (2011); Ramírez & Ramos-Elorduy (1978)
Empoasca kraemeri Ross & Moore	MX	L	Yes	No	McGuire & Crandall (1967); Serrano & Backus (1998)
Empoasca mexara Ross & Moore	MX, US	L[33]	No	No	Gill (1986); Marín et al. (2009)
Empoasca solana DeLong	MX, US	L	No	No	McKamey (2001); Metcalf & Metcalf (1993); Radcliffe & Johnson (1994)
Idiocerus sp.	MX	I, L[34]	Yes	No	Ramírez & Ramos-Elorduy (1978)
Keonolla confluens (Uhler)	MX, US	L[31]	No	No	McKamey (2001); Ramírez & Ramos-Elorduy (1978)
Macrosteles lepidus (Van Duzee)	MX, US	L[31]	No	No	Brown (1939); Ramírez & Ramos-Elorduy (1978)
Macrosteles quadrilineatus Forbes (= *M. fascifrons* [Stål])	MX, US	L, S	No	No	MacGregor & Gutiérrez (1983); McKamey (2001); Radcliffe & Johnson (1994)
Macrosteles urticae Moore & Ross	MX	L[31]	Yes	No	Ramírez & Ramos-Elorduy (1978)
Macrosteles variatus (Fallén)	MX, US	L[31]	No	No	Brown (1939); Ramírez & Ramos-Elorduy (1978)
Oncopsis sp.	MX	L[31]	Yes	No	Marín et al. (2009)
Paraphlepsius sp.	MX	L[31]	Yes	No	Marín et al. (2009)
Phera centrolineata (Signoret)	MX, US	L[31]	No	No	Marín et al. (2009); McKamey (2001)
Scaphytopius sp.	MX	L[31]	Yes	No	Marín et al. (2009)
Hemiptera: Cixiidae					
Oliarus acicus Caldwell	MX, US	L	No	No	McGuire & Crandall (1967); Meyerdirk & Hart (1982)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Hemiptera: Coreidae					
Acanthocephala femorata (F.)	MX, US	L, S	No	No	Froeschner (1998a); MAF (2004); Metcalf & Metcalf (1993)
Leptoglossus zonatus (Dallas)	MX, US	F, L	No	No	Allen (1969); Grimm & Somarriba (1999); MacGregor & Gutiérrez (1983)
Phthia picta (Drury)	MX, US	L	No	No	McGuire & Crandall (1967); Schuster & Stansly (2005)
Sphictyrtus pretiosus (Stål)	MX	F[25]	Yes	No	García (1974)
Hemiptera: Coccidae					
Saissetia tolucana (Parrott & Cockerell)	MX	S	Yes	No	Ben-Dov et al. (2011)
Hemiptera: Delphacidae					
Stobaera sp.	MX	L, S[35]	Yes	No	García (1974)
Hemiptera: Diaspididae					
Aspidiotus nerii Bouché	MX, US	L, S	No	No	Ben-Dov et al. (2011); CABI (2011)
Parlatoria oleae (Colvée)	MX, US	L, S	No	No	Biche & Sellami (1999); Watson (2005)
Hemiptera: Largidae					
Largus cinctus Herrich-Schäffer	MX, US	S	No	No	CABI (2011); PestID (2011)
Largus succinctus (L.)	MX, US	F	No	No	Arnett (2000); Felt (1899); García (1974)
Hemiptera: Lygaeidae					
Nysius ericae (Schilling)	MX	L	Yes	No[26]	McGuire & Crandall (1967); Sweet (2000)
Nysius niger Baker	MX, US	L	No	No	Ashlock & Slater (1998); Sweet (2000); Tate (1933)
Nysius raphanus Howard	MX, US	L	No	No	Sweet (2000); Wene (1958)
Pachybrachius bilobatus (Say)	MX, US	L, S	No	No	King & Saunders (1984)
Prytanes sp.	MX	R	Yes	No	PestID (2011)
Hemiptera: Membracidae					
Metcalfiella monogramma (Germar)	MX	S	Yes	No	Coto & Saunders (2004); García (1974)
Spissistilus festinus (Say)	MX, US	S	No	No	CABI (2011); McGuire & Crandall (1967); Spurgeon & Mueller (1993)

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Hemiptera: Miridae					
Creontiades rubrinervis (Stål)	MX, US	I, L	No	No	King & Saunders (1984)
Lygus sp.	MX	F, I, L, S[27]	Yes	No	McGuire & Crandall (1967)
Lygus elisus Van Duzee	MX, US	F, I, L, S[27]	No	No	Anonymous (2011); Henry & Wheeler (1998)
Lygus hesperus Knight	MX, US	I, L, S	No	No	Anonymous (2011); Rosenheim et al. (2004); Wheeler (2000)
Lygus lineolaris (Palisot de Beauvois)	MX, US	I, L	No	No	CABI (2011); Wright et al. (2006)
Poecilocapsus lineatus (F.)	MX, US	L	No	No	Henry & Wheeler (1998); Hodgson et al. (1974)
Polymerus cuneatus (Distant)	MX	S	Yes	No	García (1974); Wheeler (2001)
Hemiptera: Ortheziidae					
Insignorthezia insignis (Browne) (= *Orthezia insignis* Browne)	MX, US	L, S	No	No	Ben-Dov et al. (2011); CABI (2011)
Hemiptera: Pentatomidae					
Arvelius albopunctatus (De Geer)	MX, US	F, L, S	No	No	Panizzi et al. (2000)
Edessa rufomarginata (De Geer)	MX	L	Yes	No	Ely e Silva et al. (2004); Monte (1932); Panizzi et al. (2000)
Euschistus sp.	MX	R	Yes	No	PestID (2011)
Euschistus biformis Stål	MX, US	F, I, L[28]	No	No	Froeschner (1998b); McGuire & Crandall (1967)
Murgantia histrionica (Hahn)	MX, US	I, L	No	No	CABI (2011); McGuire & Crandall (1967)
Nezara viridula (L.)	MX, US	F, L, S	No	No	CABI (2011); Kiritani & Hôkyo (1962)
Hemiptera: Pseudococcidae					
Dysmicoccus brevipes (Cockerell)	MX, US	L, S	No	No	CABI (2011)
Dysmicoccus mackenziei Beardsley	MX, US	R, S	No	No	Ben-Dov et al. (2011); Granara de Willink (2009); Miller & Miller (2002)
Ferrisia malvastra (McDaniel) (= *F. consobrina* Williams & Watson)	MX, US	L, R	No	No	Ben-Dov et al. (2011); Culik et al. (2006); Hodgson & Hilburn (1991)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Ferrisia virgata (Cockerell)	MX, US	L, S	No	No	Ben-Dov et al. (2011); CABI (2011)
Maconellicoccus hirsutus (Green)	MX, US	L	No	No	Anonymous (2005b); Meyerdirk et al. (2001); Williams (1996)
Nipaecoccus nipae (Maskell)	MX, US	L	No	No	CABI (2011)
Nipaecoccus viridis (Newstead)	MX, US (HI)	L, S	Yes	No	CABI (2011)
Phenacoccus gossypii Townsend & Cockerell	MX, US	L	No	No	Ben-Dov et al. (2011); Hill (1983); McGuire & Crandall (1967)
Phenacoccus madeirensis Green	MX, US	L, S	No	No	CABI (2011)
Phenacoccus parvus Morrison	MX, US	L, S	No	No	Ben-Dov et al. (2011); Day et al. (2003)
Phenacoccus solani Ferris	MX, US	L, S	No	No	Ben-Dov et al. (2011); Flanders (1944)
Phenacoccus solenopsis Tinsley	MX, US	L, S	No	No	Ben-Dov et al. (2011); Joshi et al. (2010)
Planococcus sp.	MX	F	Yes	No	PestID (2011)
Planococcus citri (Risso)	MX, US	L, R, S	No	No	Ben-Dov et al. (2011); CABI (2011); Hosny (1939)
Planococcus minor (Maskell)	MX	S	Yes	No	CABI (2011); Maity et al. (1998)
Pseudococcus calceolariae (Maskell) (= *P. gahani* Green)	MX, US	T	No	No[36]	CABI (2011); Williams (1924)
Pseudococcus jackbeardsleyi Gimpel & Miller	MX, US	L, S	No	No	Gimpel & Miller (1996)
Pseudococcus longispinus (Targioni Tozzetti)	MX, US	L, S	No	No	CABI (2011)
Pseudococcus maritimus (Ehrhorn)	MX, US	L, R, T	No	No[37]	Ben-Dov et al. (2011); Boock et al. (1960); Hill (1987)
Pseudococcus sorghiellus (Forbes)	MX, US	R	No	No	Gimpel & Miller (1996)
Pseudococcus viburni (Signoret)	MX, US	T	No	Yes	Gimpel & Miller (1996)
Rhizoecus falcifer Kunckel d'Herculais	MX, US	R	No	No	Ben-Dov et al. (2011)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Hemiptera: Psyllidae					
Bactericera (= *Paratrioza*) *cockerelli* (Sulc)	MX, US	L	No	No	Cadena-Hinojosa et al. (2003); Ever & Crawford (1933); Liu & Trumble (2006)
Bactericera (= *Paratrioza*) *maculipennis* (Crawford)	MX, US	L[38]	No	No	Burckhardt & Lauterer (1997); Marín et al. (2009)
Heteropsylla texana (Crawford)	MX, US	I, L	No	No	Almeyda-León et al. (2008); Donnelly (2002)
Paracarsidara gigantea (Crawford)	MX	S	Yes	No	Armando & Fraternidad (2008); Marín et al. (2009)
Hemiptera: Rhopalidae					
Arhyssus lateralis (Say)	MX, US	S	No	No	McGuire & Crandall (1967); Paskewitz & McPherson (1983)
Hemiptera: Tingidae					
Gargaphia iridescens Champion	MX, US	L	No	No	Fenton (1934); McGuire & Crandall (1967)
Gargaphia solani Heidemann	MX, US	L	No	No	Neal & Schaefer (2000)
Hymenoptera: Formicidae					
Atta spp.	MX	L	Yes	No	McGuire & Crandall (1967); Wilson (1971)
Atta cephalotes (L.)	MX, US	L	No	No	CABI (2011); MAF (2004)
Atta insularis Guérin	MX, US	L	No	No	Bruner et al. (1945); CABI (2011)
Camponotus sp.	MX	S	Yes	No	PestID (2011)
Solenopsis geminata (F.)	MX, US	F, Sd	No	No	Bruner et al. (1945); CABI (2011); PestID (2011)
Lepidoptera: Arctiidae					
Estigmene acrea (Drury)	MX, US	L	No	No	CABI (2011); Payne (1919)
Spilosoma virginica (F.)	MX, US	L	No	No	Capinera (2001); Opler et al. (2010); Robinson et al. (2002)
Lepidoptera: Gelechiidae					
Keiferia lycopersicella (Walsingham)	MX, US	L	No	No	CABI (2011)
Pectinophora gossypiella (Saunders)	MX, US	R	No	No[39]	CABI (2011); PestID (2011)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Phthorimaea operculella (Zeller)	MX, US	F, L, R, S, T	No	Yes	CABI (2011); PestID (2011)
Tildenia glochinella (Zeller) (= *Keiferia glochinella* [Zeller], *Phthorimaea glochinella* Zeller)	MX, US	L	No	No	Heppner (2002); Morrill (1925); Povolny (1967); Robinson et al. (2011); Seliškar (2002)
Lepidoptera: Hesperiidae					
Urbanus proteus (L.)	MX, US	L	No	No	Capinera (2005a); MacGregor & Gutiérrez (1983)
Lepidoptera: Lycaenidae					
Tmolus (= *Strymon*) *echion* (L.)	MX, US	I, L	No	No	CTAHR (2006); Opler et al. (2010)
Lepidoptera: Noctuidae					
Agrotis ipsilon (Hufnagel)	MX, US	L, S	No	No	CABI (2011)
Agrotis malefida Guenée	MX, US	L	No	No	CABI (2011); Elías et al. (1966); Schuster & Boling (1973)
Agrotis repleta Walker	MX	L, S	Yes	No	King & Saunders (1984)
Autographa californica (Speyer)	MX, US	L	No	No	Capinera (2001)
Chrysodeixis (= *Pseudoplusia*) *includens* (Walker)	MX, US	L	No	No	Avila & Rodríguez-del-Bosque (2005); CABI (2011)
Copitarsia spp.	MX	F, L, S[40]	Yes	No	McGuire & Crandall (1967)
Copitarsia decolora (Guenée) (= *C. turbata* [Herrich-Schäffer])	MX	L, S, T	Yes	Yes	Alcalá (1978); Alcázar et al. (2004); Grau et al. (2003); Simmons & Pogue (2004)
Copitarsia incommoda (Walker) (= *C. consueta* [Walker])	MX	S, T	Yes	No[41]	Flores-Pérez et al. (2004); Munro (1954); Simmons & Pogue (2004)
Euxoa auxiliaris (Grote)	MX, US	L	No	No	Anweiler (2011); Capinera (2001); Robinson et al. (2002)
Feltia (= *Agrotis*) *subterranea* (F.) (= *F. annexa* [Treitschke])	MX, US	L, S	No	No	CABI (2011); Deloya & Valenzuela (1999); MacGregor & Gutiérrez (1983); Metcalf & Metcalf (1993); Nuessly et al. (2004)
Helicoverpa (= *Heliothis*) *armigera* (Hübner)	MX	L	Yes	No[42]	Hill (1983); Miller (1987)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Helicoverpa zea (Boddie)	MX, US	F, L, S	No	No	CABI (2011); Capinera (2007)
Heliothis virescens (F.)	MX, US	F, L	No	No	Barber (1933); CABI (2011)
Mamestra configurata Walker	MX, US	L	No	No	CABI (2011)
Mythimna (= *Pseudaletia*) *unipuncta* (Haworth)	MX, US	L	No	No	Anonymous (2011); CAB (1967); CABI (2011)
Peridroma saucia (Hübner)	MX, US	L, S	No	No	CABI (2011)
Spodoptera dolichos (F.)	MX, US	L, S	No	No	Capinera (2001); Pogue (2010); Robinson et al. (2011); Sanchez (2000)
Spodoptera eridania (Stoll)	MX, US	L	No	No	CABI (2011)
Spodoptera exigua (Hübner)	MX, US	L	No	No	CABI (2011)
Spodoptera frugiperda (J.E. Smith)	MX, US	L, S	No	No	CABI (2011)
Spodoptera ornithogalli (Guenée) (= *Prodenia ornithogalli* Guenée)	MX, US	L	No	No	Bruner et al. (1945); Capinera (2005b); Pogue (2010)
Trichoplusia ni (Hübner)	MX, US	L	No	No	CABI (2011)
Xestia c-nigrum (L.)	MX, US	L	No	No	CABI (2011)
Lepidoptera: Nymphalidae					
Cynthia (= *Vanessa*) *cardui* (L.)	MX, US	L	No	No	Opler et al. (2010); Robinson et al. (2011)
Lepidoptera: Pyralidae					
Ephestia kuehniella (Zeller)	MX, US	T	No	No[43]	Barnes (1958); CABI (2011); Linsley (1944); Metcalf & Metcalf (1993)
Etiella zinckenella (Treitschke)	MX, US	R, S, Sd	No	No[44]	CABI (2011); PestID (2011)
Plodia interpunctella (Hübner)	MX, US	T	No	No[45]	CABI (2011); Linsley (1944)
Lepidoptera: Sphingidae					
Manduca sp.	MX	L[46]	Yes	No	McGuire & Crandall (1967)
Manduca quinquemaculata (Haworth)	MX, US	L	No	No	CABI (2011)
Manduca (= *Phlegethontius*) *sexta* (L.)	MX, US	L	No	No	CABI (2011); García (1974)
Lepidoptera: Tortricidae					
Amorbia emigratella (Busck)	MX, US	L	No	No	Burke et al. (1994); Mau & Martin Kessing (1992)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Cydia (= *Carpocapsa*) *pomonella* (L.)	MX, US	F	No	No	CABI (2011); McGuire & Crandall (1967)
Orthoptera: Acrididae					
Melanoplus sanguinipes (F.) (= *M. mexicanus* [Saussure])	MX, US	L, S	No	No	CABI (2011); Gurney & Brooks (1959)
Orthoptera: Gryllidae					
Acheta domesticus (L.)	MX, US	R	No	No	Quarantine interception;[10] Walker (2007)
Gryllus assimilis (F.)	MX, US	L, S	No	No	CABI (2011); MacGregor & Gutiérrez (1983); Metcalf & Metcalf (1993)
Orthoptera: Gryllotalpidae					
Gryllotalpa sp.	MX	R, S, T[47]	Yes	No[48]	McGuire & Crandall (1967)
Orthoptera: Stenopelmatidae					
Stenopelmatus sp.	MX	R, T[49]	Yes	No[50]	McGuire & Crandall (1967)
Stenopelmatus fuscus Haldeman	MX, US	T	No	No[50]	Ebeling (1975)
Thysanoptera: Thripidae					
Caliothrips fasciatus (Pergande)	MX, US	I, L	No	No	King & Saunders (1984)
Frankliniella occidentalis (Pergande)	MX, US	I, L	No	No	CABI (2011); Gerhardt & Turley (1961)
Thrips palmi Karny	MX, US	L	No	No	CABI (2011)
Thrips tabaci Lindeman	MX, US	L	No	No	CABI (2011)
VIROIDS					
Citrus exocortis (Pospiviroidae)	MX, US	All parts	No	No[51]	CABI (2011)
Potato spindle tuber (Pospiviroidae)	MX, US	Sd, T	Yes[52]	No[53]	CABI (2011); Singh et al. (2000); Stevenson et al. (2001)
Tomato planta macho (Pospiviroidae)	MX	L, R, S	Yes	No[51]	Boonham et al. (2005); Galindo et al. (1982)
VIRUSES					
Abutilon mosaic (Geminiviridae)	MX, US	L, R, S	No	No	De la Torre-Almaráz et al. (2006); Anonymous (2009c); Wellman (1977)
Alfalfa mosaic (Bromoviridae)	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011)
Beet curly top (Geminiviridae)	MX, US	L, R, T	No	Yes	CABI/EPPO (1997f); Jeffries (1998)
Beet western yellows (Luteoviridae)	MX, US	L, R, S	No	No	Brunt et al. (1996); Johnstone et al. (1989)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Chilli (pepper) mosaic	MX, US	?	No	No[54]	Brauer & Eichardson (1957); Leyendecker & Nakayama (1956); Thornberry (1966)
Cucumber mosaic (Bromoviridae)	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011)
Potato aucuba mosaic (Flexiviridae)	MX, US	All parts	No	Yes	Anonymous (2009b); Brunt et al. (1996); Lozoya-Saldaña et al. (2002)
Potato leafroll (= *Corium solani* [Holmes]) (Luteoviridae)	MX, US	F, I, L, S, T	No	Yes	Alvarez (1976); CABI (2011); Tsyplenkov (2009)
Potato virus A (= *Marmor solani* Holmes) (Potyviridae)	MX, US	All parts	No	Yes	Alvarez (1976); Anonymous (2009a); Bartels (1971); Brunt et al. (1996); Pérez-Moreno et al. (2004)
Potato virus M (Flexiviridae)	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011)
Potato virus S (Flexiviridae)	MX, US	F, I, L, R, S, T	No	Yes	CABI (2011)
Potato virus X (Flexiviridae)	MX, US	All parts	No	Yes	CABI (2011); Pérez-Moreno et al. (2004)
Potato virus Y (Potyviridae)	MX, US	F, I, L, R, S, T	No	Yes	CABI (2011)
Sowbane mosaic	MX, US	L	No	No	Brunt et al. (1996); Jeffries (1998); Weingartner & Hooker (2001)
Tobacco etch (Potyviridae)	MX, US	L	No	No[55]	Brunt et al. (1996); Thornberry (1966)
Tobacco mosaic	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011); Piedra-Ibbara et al. (2005)
Tobacco rattle	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011); Pérez-Moreno et al. (2004)
Tobacco ringspot (Comoviridae)	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011)
Tobacco streak (Bromoviridae)	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011)
Tomato bushy stunt (Tombusviridae)	MX, US	All parts	No	Yes	Brunt et al. (1996); Martinez et al. (1974); Thornberry (1966)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Tomato mosaic	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011); Nelson et al. (1994)
Tomato ringspot (Comoviridae)	MX, US	All parts	No	Yes	CABI (2011); CABI/EPPO (1997g); Romanenko et al. (2004)
Tomato spotted wilt (Bunyaviridae)	MX, US	All parts	No	Yes	Brunt et al. (1996); CABI (2011)
Tomato yellow leaf curl (Geminiviridae) (= tomato leaf curl)	MX, US	L, S	No	No	Brunt et al. (1996); CABI (2011); MAF (2006)
BACTERIA					
Bacillus cereus Frankland & Frankland (Sphingobacteriales)	MX, US	T	No	Yes	Altayar & Sutherland (2006); CABI (2011); Muñoz-Castellanos et al. (2006)
Bacillus circulans Jordan (Sphingobacteriales)	MX, US	T	No	Yes	Ghosh et al. (2003); Muñoz-Castellanos et al. (2006); Rosso et al. (2002)
Bacillus megaterium De Bary (Sphingobacteriales)	MX, US	R, T	No	Yes	Lutman & Wheeler (1948); Yáñez-Morales et al. (2003)
Bacillus mesentericus Trevisan (Sphingobacteriales)	MX, US	T	No	Yes	Davidson (1948); McGuire & Crandall (1967)
Bacillus subtilis (Ehrenberg) Cohn (Sphingobacteriales)	MX, US	L, T	No	Yes	Brighigna et al. (1992); CABI (2011); Malcolmson (1960)
Burkholderia cepacia (ex Burkholder) Yabuuchi et al. (Burkholderiales) (= *Pseudomonas cepacia* [ex Burkholder] Palleroni & Holmes)	MX, US	T	No	Yes	Burkhead et al. (1994); CABI (2011); Yáñez-Morales et al. (2003)
Chromobacterium violaceum Bergonzini (Neisseriales)	MX, US	R[56]	No	No	Crosse et al. (2006); Farr & Rossman (2010); Hernandez et al. (1981)
Clavibacter michiganensis subsp. *sepedonicus* (Spieckermann & Kotthoff) Davis et al. (= *Corynebacterium sepedonicum* (Spieck. & Kotth.) Skaptason & Burkholder (Actinomycetales)	MX, US	R, S, T	No	Yes	CABI (2006); CABI/EPPO (1997c); García (1971)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Corynebacterium sp. (Actinomycetales)	MX	T	Yes	Yes	Alvarez (1976)
Enterobacter (= *Aerobacter*) *aerogenes* Hormaeche & Edwards (Enterobacteriales)	MX, US	T	No	Yes	CABI (2011); Dorozhkin et al. (1979); Euzéby (1997); Vazquez et al. (2000)
Enterobacter cloacae (Jordan) Hormaeche & Edwards (Enterobacteriales)	MX, US	T	No	Yes	CABI (2011); Farr & Rossman (2010); Hersch-Martínez et al. (2005); Schisler et al. (1997)
Erwinia sp. (Enterobacteriales)	MX	S, T[57]	Yes	Yes	Alvarez (1976)
Erwinia carotovora subsp. *atroseptica* (van Hall) Dye (= *E. atroseptica* [van Hall] Jennison, *Pectobacterium atrosepticum* [van Hall] Patel & Kulkarni) (Enterobacteriales)	MX, US	F, S, T	No	Yes	Alvarez (1979); Bradbury (1986); CABI (2011); NAPPO (2010)
Erwinia carotovora subsp. *carotovora* (Jones) Bergey et al. (= *Pectobacterium carotovorum* [Jones] Waldee) (Enterobacteriales)	MX, US	L, S, T	No	Yes	Bradbury (1986); CABI (2011); NAPPO (2010)
Erwinia chrysanthemi (Burkh.) Young et al. (Enterobacteriales)	MX, US	S, T	No	Yes	CABI (2011); Yáñez-Morales et al. (2003)
Pantoea agglomerans (Beijerinck) Gavini et al. (= *Erwinia herbicola* [Löhnis] Dye) (Enterobacteriales)	MX, US	T	No	Yes	CABI (2011); Cui et al. (2003)
Pseudomonas sp. (Pseudomonadales)	MX	T[58]	Yes	Yes	Alvarez (1976)
Pseudomonas fluorescens (Trevisan) Migula (Pseudomonadales)	MX, US	T	No	Yes	CABI (2011); Cui et al. (2003); Mazari-Hiriart et al. (2000)
Pseudomonas putida (Trevisan) Migula (Pseudomonadales)	MX, US	R	No	No	CABI (2011); Glandorf et al. (1994); Marrón-Montiel et al. (2006)
Pseudomonas syringae pv. *syringae* van Hall (= *P. syringae* van Hall) (Pseudomonadales)	MX, US	L, S	No	No	Bradbury (1986); CABI (2011); Fucikovsky & Luna (1987)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Pseudomonas syringae pv. *tabaci* (Wolf & Foster) Young et al. (Pseudomonadales)	MX, US	L	No	No	CABI (2011)
Ralstonia solanacearum race 1 (Smith) Yabuuchi et al. (Burkholderiales) (= *Pseudomonas solanacearum* [Smith] Smith)	MX, US	L, T	No	Yes	CABI (2011); McGuire & Crandall (1967)
Ralstonia solanacearum race 3 (Smith) Yabuuchi et al. (Burkholderiales)[59]	MX	R, S, T	Yes	Yes	CABI (1999); Stevenson et al. (2001)
Rhizobium radiobacter (Beijerinck & van Delden) Young et al. (= *Agrobacterium tumefaciens* [Smith & Townsend] Conn) (Rhizobiales)	MX, US	R, S	No	No	Bradbury (1986); CABI (2011)
Salmonella enteritidis (Gaertner) Castellani & Chalmers (Enterobacteriales)	MX, US	T	No	Yes	Altekruse et al. (2006); Quiroz-Santiago et al. (2009)
Streptomyces scabies (ex Thaxter) Lambert & Loria (= *Actinomyces scabies* [Thaxt.] Gussow) (Actinomycetales)	MX, US	F, R, S, T	No	Yes	CIP (1996); Farr & Rossman (2010); Quarantine interception;[10] Wellman (1977)
Xanthomonas campestris pv. *vesicatoria* (Doidge) Dye (= *X. vesicatoria* [Doidge] Dowson) (Xanthomonadales)	MX, US	L, S	No	No	Bradbury (1986); Hayward & Waterston (1964)
PHYTOPLASMAS					
Aster yellows (Acholeplasmatales)	MX, US	S, T	No	Yes	CABI (2011); Khadhair et al. (2003); Munyaneza et al. (2006); Stevenson et al. (2001)
Candidatus Liberibacter solanacearum' (= '*Ca*. L. psyllaurous')	MX, US	T	No	Yes	Munyaneza et al. (2009, 2010)
Candidatus Phytoplasma aurantifolia'	MX, US	L, T	No	Yes	Santos-Cervantes et al. (2010)
Candidatus Phytoplasma asteris' (= Potato hair sprouts-inducing)	MX, US	L, S, T	No	Yes	Lee et al. (2004); Leyva-López et al. (2002); NCBI (2009)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Columbia Basin potato purple top	MX, US	L, S, T	No	Yes	Munyaneza et al. (2006, 2007)
Mexican periwinkle virescence (Acholeplasmatales)	MX, US	L, T	No	Yes	Jomantiene et al. (1998); Santos-Cervantes et al. (2010)
Potato purple-top wilt	MX, US	All parts	No	Yes	CABI/EPPO (1997d); Jeffries (1998)
Potato witches broom	MX, US	T	No	Yes	CABI (2011); SEM (1995)
X-disease group	MX, US	L, T	No	Yes	Santos-Cervantes et al. (2010)
FUNGI and OOMYCETES					
Acremonium strictum W. Gams (Ascomycetes: Hypocreales) (= *Cephalosporium acremonium* auct. non Corda)	MX, US	L	No	No	CABI (2011); Farr & Rossman (2010)
Alternaria sp. (Ascomycetes: Pleosporales)	MX	L, T[60]	Yes	Yes	Farr & Rossman (2010)
Alternaria alternata (Fr.:Fr.) Keissl. (= *A. tenuis* Nees) (Ascomycetes: Pleosporales)	MX, US	L, S, T	No	Yes	Farr & Rossman (2010); Somani (2004); Stevenson et al. (2001)
Alternaria brassicae (Berk.) Sacc. (= *A. macrospora* [Sacc.] Sawada) (Ascomycetes: Pleosporales)	MX, US	L	No	No	Farr & Rossman (2010)
Alternaria porri (Ellis) Cif. (Ascomycetes: Pleosporales)	MX, US	L	No	No	CABI (2011); Farr & Rossman (2010)
Alternaria solani Sorauer (Ascomycetes: Pleosporales) (= *Macrosporium solani* Ellis & Martin)	MX, US	L, S, T	No	Yes	CIP (1996); Farr & Rossman (2010); Stevenson et al. (2001)
Alternaria tenuissima (Kunze:Fr.) Wiltshire (Ascomycetes: Pleosporales)	MX, US	L, S	No	No	Farr & Rossman (2010)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Armillaria mellea (Vahl:Fr.) Kumm. (Basidiomycetes: Agaricales)	MX, US	R	No	No	Farr & Rossman (2010)
Arthrinium phaeospermum (Corda) Ellis (Ascomycetes)	MX, US	T	No	Yes	Farr & Rossman (2010)
Aspergillus sp. (Ascomycetes: Eurotiales)	MX	F, R	Yes	No	PestID (2011)
Aspergillus flavus Link:Fr. (Ascomycetes: Eurotiales)	MX, US	T	No	Yes	CABI (2011); Somani (2004)
Aspergillus fumigatus Fresen. (Ascomycetes: Eurotiales)	MX, US	T	No	Yes	Farr & Rossman (2010); Somani (2004)
Aspergillus niger Tiegh. (Ascomycetes: Eurotiales)	MX, US	R, S, T	No	Yes	CABI (2011); Farr & Rossman (2010)
Athelia rolfsii (Curzi) Tu & Kimbr. (Basidiomycetes: Polyporales) (= *Corticium rolfsii* Curzi) (anamorph: *Sclerotium rolfsii* Sacc.)	MX, US	R, S, T	No	Yes	CABI (2011); Farr & Rossman (2010); Stevenson et al. (2001)
Aureobasidium pullulans (de Bary) Arnaud (Ascomycetes: Dothideales)	MX, US	L	No	No	Alarcón-González et al. (1990); CABI (2011); Farr & Rossman (2010); Hollomon (1967)
Boeremia exigua var. *exigua* (Desm.) Aveskamp et al. (= *Phoma exigua* var. *exigua* Desm., *P. exigua* Desm., *Phyllosticta bonanseana* Sacc., *P. hortorum* Speg.) (Ascomycetes: Pleosporales)	MX, US	L, S, T	No	Yes	Farr & Rossman (2010); Stevenson et al. (2001)
Boeremia lycopersici (Cooke) Aveskamp et al. (= *Ascochyta lycopersici* Brunaud) (Ascomycetes: Pleosporales)	MX, US	L	No	No	Farr & Rossman (2010)

Pest	**Geographic Distribution**[2]	**Plant Part Affected**[3]	**Quarantine Pest**[4]	**Follow Pathway**	**References**
Botryotinia fuckeliana (de Bary) Whetzel (Ascomycetes: Helotiales) (anamorph: *Botrytis cinerea* Pers.:Fr.)	MX, US	I, L, S, T	No	Yes	Choiseul & Carnegie (2000); Farr & Rossman (2010); Stevenson et al. (2001)
Ceratocystis paradoxa (Dade) Moreau (Ascomycetes: Microascales)	MX, US	L	No	No	Farr & Rossman (2010)
Cercospora sp. (Ascomycetes: Mycosphaerellales)	MX	L	Yes	No	Farr & Rossman (2010)
Cercospora physalidis Ellis (= *C. solanicola* Atk.) (Ascomycetes: Mycosphaerellales)	MX, US	L	No	No	Farr & Rossman (2010)
Choanephora cucurbitarum (Berk. & Ravenel) Thaxt. (Zygomycetes: Mucorales)	MX, US	L, S	No	No	Farr & Rossman (2010); Rojas-Martínez et al. (2009); Stevenson et al. (2001)
Cladosporium sp. (Ascomycetes: Mycosphaerellales)	MX	R, S	Yes	No	PestID (2011)
Cladosporium cladosporioides (Fresen.) De Vries (Ascomycetes: Mycosphaerellales)	MX, US	R	No	No	Farr & Rossman (2010); PestID (2011)
Cladosporium herbarum (Pers.:Fr.) Link (Ascomycetes: Mycosphaerellales)	MX, US	L, S	No	No	Farr & Rossman (2010); Kuczyn´ska (1983)
Cladosporium oxysporum Berk. & Curtis (Ascomycetes: Mycosphaerellales)	MX, US	L	No	No	Farr & Rossman (2010); Núñez-Camargo et al. (2003)
Clasterosporium putrefaciens (Fuckel) Sacc. (Ascomycetes) (= *Sporidesmium putrefaciens* Fuckel)	MX, US	L	No	No	Farr & Rossman (2010)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Cochliobolus australiensis (Tsuda & Ueyama) Alcorn (Ascomycetes: Pleosporales) (anamorph: *Bipolaris australiensis* [Ellis] Tsuda & Ueyama) (= *Drechslera australiensis* [Bugnic.] Subram. & Jain ex Ellis)	MX, US	L, S, T	No	Yes	Dwivedi (1983); Farr & Rossman (2010)
Cochliobolus hawaiiensis Alcorn (Ascomycetes: Pleosporales) (anamorph: *Bipolaris hawaiiensis* [Ellis] Uchida & Aragaki) (= *Drechslera hawaiiensis* Ellis)	MX, US	L, S, T	No	Yes	Dwivedi (1983); Farr & Rossman (2010)
Cochliobolus lunatus Nelson & Haasis (Ascomycetes: Pleosporales)	MX, US	L	No	No	CABI (2011)
Colletotrichum sp. (Ascomycetes: Phyllachorales)	MX	L, S[61]	Yes	No	Farr & Rossman (2010)
Colletotrichum capsici (Syd.) Butler & Bisby (Ascomycetes: Phyllachorales)	MX, US	L	No	No	CABI (2011); Farr & Rossman (2010)
Colletotrichum coccodes (Wallr.) Hughes (= *C. atramentarium* [Berk. & Broome] Taubenh.) (Ascomycetes: Phyllachorales)	MX, US	R, S, T	No	Yes	Farr & Rossman (2010); Lira-Saldivar et al. (2006); Malamud et al. (1994); Nitzan et al. (2006)
Colletotrichum dematium (Pers.:Fr.) Grove (Ascomycetes: Phyllachorales)	MX, US	L	No	No	Farr & Rossman (2010); Ram & Lele (1968)
Coniothyrium sp. (Ascomycetes: Pleosporales)	MX	R	Yes	No	PestID (2011)
Corticium vagum Berk. & Curtis (Agaricomycetes: Corticiales)	MX, US	S	No	No	Farr & Rossman (2010)
Corynespora cassiicola (Berk. & Curtis) Wei (Ascomycetes: Pleosporales)	MX, US	L	No	No	Farr & Rossman (2010)

Pest	**Geographic Distribution**[2]	**Plant Part Affected**[3]	**Quarantine Pest**[4]	**Follow Pathway**	**References**
Curvularia pallescens Boedijn (Ascomycetes: Pleosporales)	MX, US	L	No	No	Amusa et al. (2003); Farr & Rossman (2010); Singh & Rai (1980)
Cylindrocladium scoparium Morg. (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Almeida & Bolkan (1981); Farr & Rossman (2010)
Didymella bryoniae (Auersw.) Rehm (Ascomycetes: Pleosporales)	MX, US	L, S	No	No	CABI (2011)
Didymella lycopersici Kleb. (Ascomycetes: Pleosporales) (= *Ascochyta lycopersici* Brunaud) (anamorph: *Phoma lycopersici* Cooke)	MX, US	L, S	No	No	CABI (2011); Farr & Rossman (2010)
Doratomyces stemonitis (Pers.:Fr.) Morton & Sm. (Ascomycetes: Microascales) (= *Stysanus stemonitis* [Pers.:Fr.] Corda)	MX, US	T	No	Yes	Farr & Rossman (2010)
Epicoccum nigrum Link (= *E. purpurascens* Ehrenb.) (Ascomycetes)	MX, US	L, T	No	Yes	Chand & Logan (1984); Farr & Rossman (2010); Kuczyn´ska (1983)
Elsinoë ampelina Shear (Ascomycetes: Myriangiales)	MX, US	L, S	No	No	CABI (2011); Farr & Rossman (2010)
Erysiphe pisi var. *pisi* DC. (= *E. communis* [Wallr.:Fr.] Schltdl.) (Ascomycetes: Erysiphales)	MX, US	L, S	No	No	CABI (2011); Farr & Rossman (2010)
Erysiphe polygoni DC. (Ascomycetes: Erysiphales)	MX, US	L	No	No	Farr & Rossman (2010)
Fulvia fulva (Cooke) Cif. (Ascomycetes: Mycosphaerellales) (= *Cladosporium fulvum* Cooke)	MX, US	L	No	No	Farr & Rossman (2010); Wellman (1977)
Fusariella obstipa (Pollack) Hughes (Ascomycetes) (= *Dendryphion obstipum* Pollack)	MX, US	L, T	No	Yes	Farr & Rossman (2010); Hughes (1949); McGuire & Crandall (1967); Singh & Rai (1980)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Fusarium sp. (Ascomycetes: Hypocreales)	MX	R, S	Yes	No	PestID (2011)
Fusarium cerealis (Cooke) Sacc. (= *F. crookwellense* Burgess et al.) (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Montiel-González et al. (2005); Theron & Holz (1989)
Fusarium culmorum (Sm.) Sacc. (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010)
Fusarium equiseti (Corda) Sacc. (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	El-Hassan et al. (2004); Farr & Rossman (2010); Montiel-González et al. (2005)
Fusarium incarnatum (Desm.) Sacc. (= *F. pallidoroseum* [Cooke] Sacc., *F. semitectum* Berk. & Ravenel) (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Somani (2004)
Fusarium moniliforme Sheld. (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Kassim (1986)
Fusarium oxysporum Schltdl.:Fr. (Ascomycetes: Hypocreales)	MX, US	R, S, T	No	Yes	Farr & Rossman (2010); Stevenson et al. (2001)
Fusarium oxysporum f.sp. *vasinfectum* (Atk.) Snyder & Hansen (= *F. vasinfectum* Atk.) (Ascomycetes: Hypocreales)	MX, US	All parts	No	Yes	CABI (2011); Farr & Rossman (2010)
Fusarium poae (Peck) Wollenw. (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Lõiveke (2006); Tequida-Meneses et al. (2002)
Fusarium roseum Link:Fr. (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Rafiq et al. (1995)
Fusarium roseum f. *cereale* (Cooke) Snyder & Hansen (Ascomycetes: Hypocreales)	MX, US	R, S, T	No	Yes	Farr & Rossman (2010); Miller et al. (1996); Snyder & Hansen (1945)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Fusarium sacchari (Butler) Gams (= *Cephalosporium sacchari* Butler) (Ascomycetes: Hypocreales)	MX, US	S	No	No	Farr & Rossman (2010); Leslie et al. (2005)
Fusarium sambucinum Fuckel (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Mezzalama et al. (2000)
Fusarium sporotrichioides Sherb. (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Janke (1976); Montiel-González et al. (2005)
Fusarium subglutinans (Wollenw. & Reinking) Nelson et al. (Ascomycetes: Hypocreales)	MX, US	S	No	No	Farr & Rossman (2010)
Fusarium sulphureum Schltdl. (Ascomycetes: Hypocreales) (teleomorph: *Gibberella cyanogena* [Desm.] Sacc.)	MX, US	T	No	Yes	Farr & Rossman (2010); Guigón et al. (1994)
Fusarium ventricosum Appel & Wollenw. (= *F. argillaceum* [Fr.:Fr.] Sacc., sensu Wollenw.) (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Núñez-Camargo et al. (2003)
Fusarium verticillioides (Sacc.) Nirenberg (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	Farr & Rossman (2010); Sharifi et al. (2009)
Fusicoccum dimidiatum (Penz.) Farr (Dothideomycetes: Botryosphaeriales) (= *Hendersonula toruloidea* Nattrass)	MX, US	T	No	Yes	Farr & Rossman (2010); Punithalingam & Waterston (1970)
Geotrichum candidum Link (Saccharomycetes: Saccharomycetales)	MX, US	T	No	Yes	Farr & Rossman (2010); Kishimoto & Baker (1969)
Gibberella avenacea Cook (Ascomycetes: Hypocreales) (anamorph: *Fusarium avenaceum* [Fr.:Fr.] Sacc.)	MX, US	R, S, T	No	Yes	CABI (2011); Farr & Rossman (2010); Stevenson et al. (2001)

Pest	**Geographic Distribution**[2]	**Plant Part Affected**[3]	**Quarantine Pest**[4]	**Follow Pathway**	**References**
Gibberella baccata (Wallr.) Sacc. (Ascomycetes: Hypocreales)	MX, US	T	No	Yes	CABI (2011)
Gibberella zeae (Schwein.) Petch (Ascomycetes: Hypocreales) (anamorph: *Fusarium graminearum* Schwabe)	MX, US	T	No	Yes	CABI (2011); Daami-Remadi et al. (2006); Farr & Rossman (2010)
Glomerella cingulata (Stoneman) Spauld. & Schrenk (Ascomycetes) (anamorph: *Colletotrichum gloeosporioides* [Penz.] Penz. & Sacc.)	MX, US	L, S	No	No	Farr & Rossman (2010)
Golovinomyces cichoracearum (DC.) Heluta (= *Erysiphe cichoracearum* DC.) (Ascomycetes: Erysiphales)	MX, US	L, S	No	No	CABI (2011); Farr & Rossman (2010); Stevenson et al. (2001)
Golovinomyces orontii (Castagne) Heluta (Ascomycetes: Erysiphales)	MX, US	L	No	No	Cunnington et al. (2005); Farr & Rossman (2010)
Haematonectria haematococca (Berk. & Broome) Samuels & Rossman (Ascomycetes: Hypocreales) (= *Nectria haematococca* Berk. & Broome) (anamorph: *Fusarium solani* [Mart.] Sacc.)	MX, US	R, T	No	Yes	CABI (2011); Farr & Rossman (2010); Hunter & Buddenhagen (1972)
Helminthosporium solani Durieu & Mont. (Ascomycetes: Pleosporales) (= *Spondylocladium atrovirens* [Harz] Harz ex Sacc.)	MX, US	T	No	Yes	CABI (2011); Farr & Rossman (2010); Wellman (1977)
Hypocrea rufa (Pers.:Fr.) Fr. (Ascomycetes: Hypocreales) (anamorph: *Trichoderma viride* Pers.:Fr.)	MX, US	S	No	No	CABI (2011); Farr & Rossman (2010)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Lasiodiplodia theobromae (Pat.) Griffon & Maubl. (Ascomycetes: Dothideales) (= *Botryodiplodia theobromae* Pat.)	MX, US	L, R, S	No	No	CABI (2011); Farr & Rossman (2010)
Leptosphaerulina trifolii (Rostr.) Petr. (Ascomycetes: Pleosporales) (= *Pseudoplea trifolii* [Rostr.] Petr.)	MX, US	L	No	No	Farr & Rossman (2010)
Leveillula taurica (Lév.) Arnaud (Ascomycetes: Erysiphales)	MX, US	L	No	No	CABI (2011)
Macrophomina phaseolina (Tassi) Goidanich (Ascomycetes) (= *Sclerotium bataticola* Taubenhaus)	MX, US	S, T	No	Yes	Farr & Rossman (2010); Kirk (2008a); Stevenson et al. (2001)
Monographella nivalis (Schaffnit) Müll. (Sordariomycetes: Xylariales) (= *Fusarium nivale* [Fr.] Sorauer)	MX, US	L	No	No	Farr & Rossman (2010); Kirk (2008b); Rakhimov & Khakimov (2000)
Microsphaeropsis sp. (Ascomycetes: Dothideales)	MX	S	Yes	No	PestID (2011)
Myrothecium roridum Tode:Fr. (Ascomycetes: Hypocreales)	MX, US	S	No	No	Brooks (1945); Farr & Rossman (2010)
Nectria sp. (Ascomycetes: Hypocreales)	MX	S	Yes	No	Farr & Rossman (2010)
Nectria ventricosa Booth (Ascomycetes: Hypocreales) (= *Hypomyces solani* Reinke & Berthier) (anamorph: *Fusarium ventricosum* Appel & Wollenw.)	MX, US	T	No	Yes	Farr & Rossman (2010); Hwang (1948); Wellman (1977)
Neocosmospora vasinfecta var. *vasinfecta* Sm. (Ascomycetes: Hypocreales)	MX, US	R, S	No	No	Farr & Rossman (2010)

Pest	**Geographic Distribution**[2]	**Plant Part Affected**[3]	**Quarantine Pest**[4]	**Follow Pathway**	**References**
Nigrospora sphaerica (Sacc.) Mason (Ascomycetes: Trichosphaeriales)	MX, US	F, L, S	No	No	Farr & Rossman (2010)
Oidium sp. (Ascomycetes: Erysiphales)	MX	L	Yes	No	Farr & Rossman (2010)
Oidium balsamii Mont. (Ascomycetes: Erysiphales)	MX	L	Yes	No	Farr & Rossman (2010)
Papulaspora coprophila (Zukal) Hotson (Ascomycetes)	MX, US	S	No	No	Farr & Rossman (2010)
Penicillium sp. (Ascomycetes: Eurotiales)	MX	T[62]	Yes	Yes	Farr & Rossman (2010)
Penicillium chrysogenum Thom (Ascomycetes: Eurotiales)	MX, US	T	No	Yes	Contois (1953); Farr & Rossman (2010); Somani (2004); Tequida-Meneses et al. (2002)
Penicillium dangeardii Pitt (Ascomycetes: Eurotiales) (teleomorph: *Talaromyces flavus* [Klöcker] Stolk & Samson)	MX, US	R	No	No	Farr & Rossman (2010); Spink & Rowe (1989)
Penicillium expansum Link (= *P. glaucum* Link) (Ascomycetes: Eurotiales)	MX, US	T	No	Yes	Farr & Rossman (2010); Lugauskas et al. (2005)
Penicillium janthinellum Biourge (Ascomycetes: Eurotiales)	MX, US	T	No	Yes	Froto & Bailey de Ibarra (1983); Somani (2004)
Periconia byssoides Pers. (Ascomycetes)	MX, US	S	No	No	Farr & Rossman (2010)
Peyronellaea glomerata (Corda) Goid. ex Togliani (= *Phoma glomerata* [Corda] Wollenw. & Hochapfel) (Ascomycetes: Pleosporales)	MX, US	T	No	Yes	Farr & Rossman (2010); Morgan-Jones (1967); Wiese (1987)
Phoma sp. (Ascomycetes: Pleosporales)	MX	L, S	Yes	No	PestID (2011)
Phoma destructiva Plowr. (Ascomycetes: Pleosporales)	MX, US	L	No	No	Farr & Rossman (2010)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Phoma herbarum var. *herbarum* Westend. (= *P. herbarum* Westend.) (Ascomycetes: Pleosporales)	MX, US	L, T	No	Yes	Borborua (1990); Farr & Rossman (2010); Janke & Zott (1980); Rivero-Cruz et al. (2003)
Phyllosticta gossypina Ellis & Martin (Ascomycetes: Dothideales)	MX, US	L	No	No	Farr & Rossman (2010)
Phymatotrichopsis omnivora (Duggar) Hennebert (= *Phymatotrichum omnivorum* Duggar) (Basidiomycetes)	MX, US	R	No	No	Farr & Rossman (2010)
Phytophthora cactorum (Lebert & Cohn) Schröt. (Oomycetes: Pythiales)	MX, US	S	No	No	Causin et al. (2005); Farr & Rossman (2010)
Phytophthora capsici Leonian (Oomycetes: Pythiales)	MX, US	F, R, S	No	No	CABI (2011); Farr & Rossman (2010)
Phytophthora cinnamomi var. *cinnamomi* Rands (= *P. cinnamomi* Rands) (Oomycetes: Pythiales)	MX, US	R	No	No	Erwin & Ribeiro (1996); Farr & Rossman (2010)
Phytophthora citrophthora (Sm. & Sm.) Leonian (Oomycetes: Pythiales)	MX, US	F, L, R, S	No	No	CABI (2011); Farr & Rossman (2010)
Phytophthora cryptogea Pethybr. & Laff. (Oomycetes: Pythiales)	MX, US	L, R, S, T	No	Yes	CABI (2011); Farr & Rossman (2010); Ojeda & Zak (1993); Stevenson et al. (2001)
Phytophthora drechsleri Tucker (Oomycetes: Pythiales)	MX, US	T	No	Yes	Farr & Rossman (2010)
Phytophthora erythroseptica var. *erythroseptica* Waterhouse (Oomycetes: Pythiales)	MX, US	T	No	Yes	Erwin & Ribeiro (1996); Farr & Rossman (2010)
Phytophthora infestans (Mont.) de Bary (Oomycetes: Pythiales) (= *Peronospora infestans* [Mont.] Casp.)	MX, US	All parts	No	Yes	Farr & Rossman (2010); Stevenson et al. (2001)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Phytophthora nicotianae Breda de Haan (= *Phytophthora parasitica* Dastur) (Oomycetes: Pythiales)	MX, US	L, S, T	No	Yes	Erwin & Ribeiro (1996); Farr & Rossman (2010); García (1971)
Phytophthora palmivora var. *palmivora* (Butler) Butler (= *P. agaves* Gandara, *P. faberi* Maubl., *P. palmivora* [Butler] Butler) (Oomycetes: Pythiales)	MX, US	T	No	Yes	Erwin & Ribeiro (1996); Farr & Rossman (2010)
Pleospora herbarum (Pers.:Fr.) Rabenh. (Ascomycetes: Pleosporales)	MX, US	L	No	No	Farr & Rossman (2010); Stevenson et al. (2001); Weingartner & Hooker (2001)
Polysaccopsis hieronymi (Schröt.) Henn. (Ustilaginomycetes: Urocystales)	MX	L, S	Yes	No	Farr & Rossman (2010); Wellman (1977)
Puccinia pittieriana Henn. (Urediniomycetes: Uredinales)	MX	F, I, L, S	Yes	No	CABI (2011); Stevenson et al. (2001)
Puccinia substriata Ellis & Barthol. (= *P. tubulosa* [Pat. & Gaillard] Arthur) (Urediniomycetes: Uredinales)	MX, US	L	No	No	Farr & Rossman (2010); Ramachar & Cummins (1965); Wellman (1972)
Pythium aphanidermatum (Edson) Fitzp. (Oomycetes: Pythiales)	MX, US	R, S, T	No	Yes	CABI (2011); Stevenson et al. (2001)
Pythium arrhenomanes Drechsler (Oomycetes: Pythiales)	MX, US	R	No	No	CABI (2011); Farr & Rossman (2010)
Pythium debaryanum Auct. non Hesse (Oomycetes: Pythiales)	MX, US	T	No	Yes	Badilla (1975); Farr & Rossman (2010)
Pythium irregulare Buisman (= *P. polymorphon* Sideris) (Oomycetes: Pythiales)	MX, US	R	No	No	Farr & Rossman (2010)
Pythium myriotylum Drechsler (Oomycetes: Pythiales)	MX, US	R, S	No	No	CABI (2011); Farr & Rossman (2010); Kang et al. (2006)
Pythium ultimum Trow (Oomycetes: Pythiales)	MX, US	T	No	Yes	CABI (2011); Johnson et al. (2004)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Ramularia solani Sherb. (Ascomycetes: Mycosphaerellales)	MX, US	L[63]	No	No	Farr & Rossman (2010)
Rhizoctonia crocorum (Pers.:Fr.) DC. (= *R. violacea* Tul. & Tul.) (Basidiomycetes: Corticiales) (teleomorph: *Helicobasidium purpureum* Pat.)	MX, US	S, T	No	Yes	Farr & Rossman (2010)
Rhizoctonia microsclerotia Matz (Basidiomycetes: Corticiales)	MX, US	L	No	No	Farr & Rossman (2010); Wellman (1977)
Rhizopus sp. (Zygomycetes: Mucorales)	MX	T[64]	Yes	Yes	Farr & Rossman (2010)
Rhizopus stolonifer (Ehrenb.:Fr.) Vuill. (= *R. nigricans* Ehrenb.) (Zygomycetes: Mucorales)	MX, US	T	No	Yes	Farr & Rossman (2010); Somani (2004)
Rosellinia bunodes (Berk. & Broome) Sacc. (Ascomycetes: Xylariales)	MX, US (PR, VI)	R, S, T	Yes	Yes	Farr & Rossman (2010); Wellman (1977)
Rosellinia necatrix Prill. (Ascomycetes: Xylariales)	MX, US	R	No	No	CABI (2011); Farr & Rossman (2010)
Rosellinia pepo Pat. (Ascomycetes: Xylariales)	MX	R, S, T	Yes	Yes	Farr & Rossman (2010); Wellman (1977)
Sclerotinia sclerotiorum (Lib.) de Bary (Ascomycetes: Helotiales)	MX, US	S, T	No	Yes	Farr & Rossman (2010); Stevenson et al. (2001)
Septoria lycopersici Speg. (Ascomycetes: Mycosphaerellales)	MX, US	L	No	No	Farr & Rossman (2010); Stevenson et al. (2001)
Spongospora subterranea f. sp. *subterranea* Tomlinson (= *S. solani* Brunchorst, *S. subterranea* [Wallroth] Lagerheim) (Plasmodiophoromycetes : Plasmodiophorales)	MX, US	F, R, S, T	No	Yes	Farr & Rossman (2010); Quarantine interception;[10] Stevenson et al. (2001)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Stemphylium solani G.F. Weber (Ascomycetes: Pleosporales)	MX, US	L	No	No	Farr & Rossman (2010)
Synchytrium endobioticum (Schilb.) Percival (Chytridiomycetes: Chytridiales)	MX, US	I, L, S, T	Yes[65]	Yes	Farr & Rossman (2010); Stevenson et al. (2001)
Thanatephorus cucumeris (Frank) Donk (Basidiomycetes: Ceratobasidiales) (= *Corticium solani* [Prill. & Delacr.] Bourdot & Galzin, *Pellicularia filamentosa* [Pat.] Rogers) (anamorph: *Rhizoctonia solani* Kühn)	MX, US	F, R, S, T	No	Yes	CABI (2011); Farr & Rossman (2010); Quarantine interception;[10] Stevenson et al. (2001)
Thecaphora solani (Thirum. & O'Brien) Mordue (Ustilaginomycetes: Ustilaginales) (= *Angiosorus solani* Thirum. & O'Brien)	MX	F, R, S, T	Yes	Yes	Farr & Rossman (2010); Quarantine interception;[10] Stevenson et al. (2001); Weingartner & Hooker (2001)
Thielaviopsis basicola (Berk. & Broome) Ferraris (Ascomycetes: Microascales) (= *Chalara elegans* Nag Raj & Kendr.)	MX, US	R	No	No	CABI (2011); Farr & Rossman (2010)
Trichothecium roseum [Pers.:Fr.] Link (Ascomycetes)	MX, US	T	No	Yes	Farr & Rossman (2010); Somani (2004)
Ulocladium atrum Preuss (Ascomycetes: Pleosporales)	MX, US	L	No	No	CABI (2011); Farr & Rossman (2010)
Verticillium sp. (Ascomycetes: Hypocreales)	MX	T[66]	Yes	Yes	Farr & Rossman (2010)
Verticillium albo-atrum Reinke & Berthier (Ascomycetes: Hypocreales)	MX, US	R, S, T	No	Yes	CABI (2011); Stevenson et al. (2001)
Verticillium dahliae Kleb. (Ascomycetes: Hypocreales)	MX, US	All parts	No	Yes	CABI (2011)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Verticillium lateritium (Ehrenb.) Rabenh. (Ascomycetes: Hypocreales)	MX, US	S	No	No	Farr & Rossman (2010)
Xylaria apiculata Cooke (Ascomycetes: Xylariales)	MX, US	T	No	Yes	Farr & Rossman (2010)
NEMATODES					
Aphelenchoides sp. (Aphelenchoididae)	MX	R[67]	Yes	No	Desgarennes et al. (2009)
Aphelenchoides fragariae (Ritzema Bos) Christie (Aphelenchoididae)	MX, US	L	No	No	CABI (2011); Jensen et al. (1979)
Aphelenchus avenae Bastian (Aphelenchidae)	MX, US	T	No	Yes	Handoo (2007); Khan & Hussain (2004)
Belonolaimus longicaudatus Rau (Belonolaimidae)	MX, US	R, T	No	No[68]	CABI (2011); Stevenson et al. (2001)
Cactodera sp. (Heteroderidae)	MX	S	Yes	No	PestID (2011)
Cactodera cacti Filipjev & Schuurmans Stekhoven (Heteroderidae)	MX, US	R	No	No	CABI (2011); Handoo (2007)
Ditylenchus destructor Thorne (Anguinidae)	MX, US	S, T	No	Yes	Brodie et al. (1993); CABI (2011)
Ditylenchus dipsaci (Kühn) Filipjev (Anguinidae)	MX, US	L, S, T	No	Yes	Brodie et al. (1993); CABI (2011)
Ecumenicus monohystera (de Man) Thorne (Qudsianematidae)	MX, US	R[67]	No	No	Desgarennes et al. (2009); UNL (2011)
Globodera rostochiensis (Wollenweber) Behrens (= *Heterodera rostochiensis* Wollenweber) (Heteroderidae)	MX, US	R, T	Yes[69]	No[70]	Brodie (1993); CABI (2011); Handoo (2007); Stevenson et al. (2001)
Globodera solanacearum (Miller & Gray) Behrens (Heteroderidae)	MX, US	R	No	No	Handoo (2007): Jensen et al. (1979)
Globodera tabacum (Lownsbery & Lownsbery) Behrens (Heteroderidae)	MX, US	R	No	No	CABI (2011)
Helicotylenchus digonicus Perry (Hoplolaimidae)	MX, US	T[71]	No	Yes	Handoo (2007); Olthof et al. (1982)

Pest	**Geographic Distribution**[2]	**Plant Part Affected**[3]	**Quarantine Pest**[4]	**Follow Pathway**	**References**
Helicotylenchus dihystera (Cobb) Sher (= *H. nannus* Steiner) (Hoplolaimidae)	MX, US	R, T	No	Yes	CABI (2011); Wellman (1977)
Helicotylenchus pseudorobustus (Steiner) Golden (Hoplolaimidae)	MX, US	R	No	No	CABI (2011); Handoo (2007)
Heterodera n. sp. (Heteroderidae)	MX	R[72]	Yes	No	Handoo (2007)
Heterodera marioni (Cornu) Goodey (Heteroderidae)	MX, US	R, T	No	Yes	Carter (1945); Cunningham (1936); Handoo (2007)
Heterodera schachtii Schmidt (Heteroderidae)	MX, US	R	No	No	CABI (2011); Handoo (2007)
Meloidogyne sp. (Meloidogynidae)	MX	R, T[73]	Yes	Yes	Handoo (2007)
Meloidogyne arenaria (Neal) Chitwood (Meloidogynidae)	MX, US	R, T	No	Yes	CABI (2011)
Meloidogyne chitwoodi Golden et al. (Meloidogynidae)	MX, US	R, T	No	Yes	CABI (2011)
Meloidogyne exigua Goeldi (Meloidogynidae)	MX, US	R, T	No	Yes	Lehman & Lordello (1982); Vazquez (1971); Wellman (1977)
Meloidogyne hapla Chitwood (Meloidogynidae)	MX, US	R, T	No	Yes	CABI (2011); Handoo (2007)
Meloidogyne incognita (Kofoid & White) Chitwood (Meloidogynidae)	MX, US	R, T	No	Yes	CABI (2011); Stevenson et al. (2001)
Meloidogyne javanica (Treub) Chitwood (Meloidogynidae)	MX, US	R, T	No	Yes	CABI (2011); Stevenson et al. (2001)
Nacobbus aberrans (Thorne) Thorne & Allen (Pratylenchidae)	MX, US	R, T	Yes[74]	Yes	Manzanilla-López et al. (2002)
Paratrichodorus minor (Colbran) Siddiqi (Trichodoridae)	MX, US	R, T	No	No[68]	Handoo (2007); Stevenson et al. (2001)
Paratylenchus sp. (Criconematidae)	MX	R[67]	Yes	No	Desgarennes et al. (2009)
Pratylenchus sp. (Pratylenchidae)	MX	R[75]	Yes	No	Handoo (2007)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Pratylenchus brachyurus (Godfrey) Filipjev & Schuurmans Stekhoven (Pratylenchidae)	MX, US	R, T	No	Yes	CABI (2011)
Pratylenchus coffeae (Zimmermann) Filipjev & Schuurmans Steckhoven (Pratylenchidae)	MX, US	R, T	No	Yes	CABI (2011)
Pratylenchus hexincisus Taylor & Jenkins (Pratylenchidae)	MX, US	R, S	No	No	Brodie (1984); Handoo (2007)
Pratylenchus neglectus (Rensch) Filipjev & Schuurmans Stekhoven (Pratylenchidae)	MX, US	R	No	No	Hafez et al. (1999); Handoo (2007); Sandoval & Téliz (1990)
Pratylenchus penetrans (Cobb) Filipjev & Schuurmans Stekhoven (Pratylenchidae)	MX, US	R, T	No	Yes	CABI (2011); Raabe et al. (1981)
Pratylenchus pratensis (de Man) Filipjev (Pratylenchidae)	MX, US	R, T	No	Yes	Handoo (2007); Jatala & Kaltenbach (1978); Raabe et al. (1981)
Pratylenchus scribneri Steiner (Pratylenchidae)	MX, US	T	No	Yes	Loof (1991)
Pratylenchus thornei Sher & Allen (Pratylenchidae)	MX, US	R, T	No	Yes	CABI (2011); Hooker (1981)
Pratylenchus vulnus Allen & Jensen (Pratylenchidae)	MX, US	R	No	No	CABI (2011); Téliz & Goheen (1968); Weingartner & Hooker (2001)
Psilenchus hilarulus de Man (Tylenchidae)	MX, US	T	No	Yes	Handoo (2007); Khan & Hussain (2004)
Punctodera chalcoensis Stone et al. (Heteroderidae)	MX	T	Yes	No[76]	Handoo (2007)
Punctodera punctata (Thorne) Mulvey & Stone (= *Heterodera punctata* Thorne) (Heteroderidae)	MX, US	R	No	No	CABI (2011); Handoo (2007)
Radopholus similis (Cobb) Thorne (Pratylenchidae)	MX, US	R, T	No	Yes	CABI (2011); Louw (1982)
Rotylenchulus reniformis Linford & Oliveira (Hoplolaimidae)	MX, US	R	No	No	CABI (2011)

Pest	Geographic Distribution[2]	Plant Part Affected[3]	Quarantine Pest[4]	Follow Pathway	References
Scutellonema brachyurus (Steiner) Andrássy (Hoplolaimidae)	MX, US	R	No	No	CABI (2011); Handoo (2007); Schuerger & McClure (1983)
Tylenchorhynchus annulatus (Cassidy) Golden (= *T. martini* Fielding) (Dolichodoridae)	MX, US	T	No	Yes	CABI (2011); Handoo (2007); Khan & Hussain (2004)
Xiphinema sp. (Xiphinematidae)	MX	R[77]	Yes	No	Alvarez (1976)
Xiphinema americanum Cobb (Xiphinematidae)	MX, US	R	No	No	CABI (2011)
Xiphinema index Thorne & Allen (Xiphinematidae)	MX, US	R	No	No	CABI (2011); Zullini (1973)

[1] Synonyms: *Lycopersicon tuberosum* (L.) Mill., *Solanum andigenum-tuberosum*, *S. aracatscha* Bess., *S. chocclo* Bukasov & Lechn., *S. esculentum* Neck., *S. leptostigma* Juz. ex Bukasov, *S. sinense* Blanco, *S. tuberosum-andigenum* (Wellman, 1972, 1977; Brunt et al., 1996; Porcher, 2010).
[2] Distribution: HI = Hawaii, MX = Mexico, PR = Puerto Rico, US = United States, VI = U.S. Virgin Islands
[3] Plant Parts: F = Fruit, I = Inflorescence, L = Leaf, R = Root, S = Stem, Sd = Seed, T = Tuber
[4] Organisms listed at the level of genus, although regarded as quarantine pests because of their uncertain identity, are not considered for further analysis as their identity is not defined clearly enough to ensure that the risk assessment is performed on a distinct organism (IPPC, 2009: ISPM #11).
[5] Species is a stored-products pest (CABI, 2011), and is considered unlikely to be associated with potato tubers at harvest.
[6] Feeding site typical of species of Chrysomelidae (Riley et al., 2002).
[7] Feeding site typical of species of Galerucinae (Riley et al., 2002).
[8] Larvae are surface feeders on substrates, such as sweet potato storage roots (Pitre & Kantack, 1962). They are considered unlikely to remain with potato tubers through harvest and post-harvest processing.
[9] Feeding site typical of species of Alticini (Riley et al., 2002).
[10] This footnote was deleted.
[11] Feeding site typical of species of Criocerinae (Riley et al., 2002).
[12] Feeding site typical of species of *Leptinotarsa* (Hsiao, 1988).
[13] Species apparently is restricted to hosts in *Hymenoclea* (Asteraceae) (Jolivet, 1998; Clark et al., 2004). Potato is not considered to be a usual host.
[14] Feeding sites typical of species of *Myochrous* (e.g., McGregor, 1917; Roel & Degrande, 1989).
[15] Feeding site typical of species of *Omophoita* (e.g., *O. sexnotata* [Harold]; Bergmann et al., 1983).
[16] Potato is considered a doubtful host (Clark et al., 2004).
[17] Host plants are largely or exclusively restricted to Convolvulaceae (Capinera, 2009).
[18] Likely a misspelling of *C. laurentii* (Guérin-Méneville), which is considered to be a synonym of *C. amplicollis* (Stone, 1975).
[19] Feeding site typical of species of Meloidae (Metcalf & Metcalf, 1993).
[20] Feeding sites typical of species of *Phyllophaga* (Capinera, 2001).
[21] Larvae may feed externally on tubers (Capinera, 2001), but are considered unlikely to remain with tubers through harvest and post-harvest processing.
[22] Record for Mexico (Takano et al., 2005) apparently is a misidentification. There is no credible evidence that the species occurs in that country (Scheffer & Lewis, 2001; CABI, 2002; EPPO, 2006a).
[23] May be a synonym of *Euribia latifrons* (Wulp), recorded on potato in Mexico (García, 1974). The genus *Euribia* Meigen has been given as a synonym of *Urophora* Robineau-Desvoidy, but apparently is an invalid name (Stone et al., 1965; Foote, 1980).
[24] Feeding site typical of species of *Paroxyna* (Novak & Foote, 1968).

[25] Feeding site typical of species of *Sphictyrtus* (e.g., *S. chryseis* [Lichtenstein]; Ojima et al., 1976).
[26] Species is considered to be strictly Palaearctic (Old World) in distribution (Sweet, 2000).
[27] Feeding sites typical of species of *Lygus* (Metcalf & Metcalf, 1993; Capinera, 2001).
[28] Feeding sites typical of species of *Euschistus* (Capinera, 2001).
[29] Feeding site characteristic of Aleyrodidae (Metcalf & Metcalf, 1993).
[30] Species may occur on potato tubers in the field (Aguiar & Ilharco, 1997) and sprouts of stored potato tubers (Gratwick, 1989), but is considered unlikely to be associated with fresh tubers for export.
[31] Feeding site typical of species of Cicadellidae (DeLong, 1971).
[32] Feeding site typical of species of *Draeculacephala* (e.g., *D. mollipes* [Say]; Hill, 1987).
[33] Feeding site typical of species of *Empoasca* (Hill, 1987).
[34] Feeding sites typical of species of *Idiocerus* (Hill, 1987).
[35] Feeding sites typical of species of *Stobaera* (e.g., *S. concinna* [Stål], *S. tricarinata* [Say]; Reimer & Goeden, 1982; Calvert et al., 1987).
[36] Species has been recorded on potato tubers (Williams, 1924), but is considered unlikely to remain with tubers through harvest and post-harvest processing.
[37] Species may infest stored potato (Boock et al., 1960), but is considered unlikely to be associated with fresh tubers for export.
[38] Feeding site typical of species of *Bactericera* (e.g., *B. tremblayi* [Wagner]; Kazemi & Jafarloo, 2008).
[39] Host plants are restricted to Malvaceae (Metcalf & Metcalf, 1993).
[40] Plant parts typically attacked by larvae of *Copitarsia* spp. (Venette & Gould, 2006).
[41] Geographic range of this species apparently is restricted to South America (Simmons & Pogue, 2004). Its reported occurrence in Mexico (MacGregor & Gutiérrez, 1983; Flores-Pérez et al., 2004) apparently is based on a misidentification.
[42] Reports of this species' occurrence in the New World apparently result from a misidentification of *H. zea* (Boddie) (CABI, 2011).
[43] Species is a stored-products pest (Metcalf & Metcalf, 1993), and is considered unlikely to be associated with potato tubers at harvest.
[44] Host plants are restricted to Fabaceae (Capinera, 2001).
[45] Species is a stored-products pest (CABI, 2011), which may infest dehydrated potato (Linsley, 1944). It is considered unlikely to be associated with fresh potato tubers at harvest.
[46] Feeding site typical of species of *Manduca* (Hill, 1987).
[47] Feeding sites typical of species of *Gryllotalpa* (Hill, 1987).
[48] Feeding damage to tubers or tuberous roots by species of *Gryllotalpa* (e.g., *G. africana* Palisot de Beauvois; Matsuura et al., 1985) is superficial. The pest is considered unlikely to remain with potato tubers through harvest and post-harvest processing.
[49] Feeding sites typical of species of *Stenopelmatus* (Ebeling, 1975; Vandergast et al., 2007).
[50] Although potato and other root crops may be fed upon while in the soil (Ebeling, 1975), as it is an external feeder, the insect is not considered likely to remain with potato tubers through harvest and post-harvest processing.
[51] Potato apparently is only an experimental host (Jeffries & James, 2005).
[52] Prohibited/quarantine pest (7 CFR §319.37-2). The viroid is under official control in the U.S. potato crop (EPPO, 2004).
[53] The viroid has not been identified in commercial potato crops in Mexico (Martínez-Soriano et al., 1996).
[54] Record is based on a single bibliographic entry (Thornberry, 1966). Existence or host status of this virus is not corroborated by available, comprehensive sources (e.g., Brunt et al., 1996; Stevenson et al., 2001; Büchen-Osmond, 2006; Robinson et al., 2007).
[55] Virus infects potato only experimentally (Jeffries, 1998).
[56] Typically inhabiting the rhizosphere of plants (e.g., Idris et al., 2007), and presumably associated with roots.
[57] Sites of infection in potato typical of species of *Erwinia* (Stevenson et al., 2001).
[58] Site of infection in potato typical of species of *Pseudomonas* (Stevenson et al., 2001).
[59] Often referred to as "biovar 2 (race 3)," which, in general, is equivalent to race 3 *sensu lato* (Hayward, 1991; Fegan & Prior, 2005).
[60] Sites of infection typical of species of *Alternaria* (e.g., Stevenson et al., 2001).
[61] Sites of infection typical of species of *Colletotrichum* (Horst, 2001).
[62] Site of infection in potato reported for *Penicillium* sp. (Somani & Chauhan, 2001).
[63] Site of infection typical of species of *Ramularia* (Horst, 2001).
[64] Site of infection in potato reported for *Rhizopus* sp. (Somani & Chauhan, 2001).
[65] Previously reported from Maryland, Pennsylvania, and West Virginia in the United States (e.g., Farr & Rossman, 2010), the pathogen has since been eradicated from those states (O'Brien & Rich, 1979; CABI/EPPO, 1997a).

[66] Site of infection in potato reported for *Verticillium* sp. (Somani & Chauhan, 2001).
[67] Recorded from the rhizosphere of potato (Desgarennes et al., 2009), and presumably associated with roots.
[68] Species is an ectoparasite (Stevenson et al., 2001), and is considered unlikely to remain with potato tubers through harvest and processing.
[69] Under official control (7 CFR §301.85).
[70] Under official control in Mexico (NAPPO, 2010).
[71] Site of infestation typical of species of *Helicotylenchus* (Hooker, 1981).
[72] Site of infestation typical of species of *Heterodera* (Weischer, 1977).
[73] Sites of infestation typical of species of *Meloidogyne* (Stevenson et al., 2001).
[74] The potato pathotype of *N. aberrans*, which occurs in Mexico, is absent from the United States (Inserra et al., 2005).
[75] Preferred feeding site of species of *Pratylenchus* (Stevenson et al., 2001).
[76] Species apparently is restricted to hosts in the genus *Zea* (Poaceae) (Stone et al., 1976; Baldwin & Mundo-Ocampo, 1991; SON, 2003). The single interception, with seed potatoes (Handoo, 2007), is not indicative of a true host association.
[77] Site of infestation in potato typical of species of *Xiphinema* (Jatala, 1986).

We did not place *Musca* sp. on the pest list above because a single interception in baggage is insufficient evidence for a host association.

Quarantine pests that reasonably can be expected to follow the pathway (i.e., be included in consignments of potato tubers) are subjected to steps 5-7 (USDA, 2000) in the following sections of this risk assessment. These pests are listed below (Table 4).

Table 4. Quarantine pests selected for further analysis.

Type	Organism
Arthropods	*Epicaerus cognatus* Sharp (Coleoptera: Curculionidae)
	Copitarsia decolora (Guenée) (Lepidoptera: Noctuidae)
Bacterium	*Ralstonia solanacearum* race 3 (Smith) Yabuuchi et al. (Burkholderiales)
Fungi	*Rosellinia bunodes* (Berk. & Broome) Sacc. (Ascomycetes: Xylariales)
	Rosellinia pepo Pat. (Ascomycetes: Xylariales)
	Synchytrium endobioticum (Schilb.) Percival (Chytridiomycetes: Chytridiales)
	Thecaphora solani (Thirum. & O'Brien) Mordue (Ustilaginomycetes: Ustilaginales)
Nematode	*Nacobbus aberrans* (Thorne) Thorne & Allen (Pratylenchidae)

2.5. Consequences of Introduction—Economic/Environmental Importance

Potential consequences of introduction are rated using five risk elements: Climate-Host Interaction, Host Range, Dispersal Potential, Economic Impact, and Environmental Impact. These elements reflect the biology, host ranges and climatic/geographic distributions of the pests. For each risk element, pests are assigned a rating of Low (1 point), Medium (2 points), or High (3 points) (USDA, 2000). A Cumulative Risk Rating is then calculated by summing all risk element values. Risk values determined for the consequences of introduction for each pest are summarized below (Table 5).

Copitarsia decolora	**Risk Ratings**
Risk Element #1: Climate-Host Interaction *Copitarsia decolora* (= *C. turbata* [Herrich-Schäffer]; Simmons & Pogue, 2004) is reported to occur in Argentina (Chubut to Santiago del Estero), Bolivia, Chile (Region I to Region X), Colombia (Cundinamarca, Antioquia), Costa Rica, Ecuador, Guatemala (Totonicapán), Mexico (Aguascalientes, Chiapas, Durango, Guerrero, México, Mexico City, Michoacán, Puebla, San Luis Potosi, Veracruz), Peru, Uruguay, and Venezuela (Liberman, 1986; Castillo & Angulo, 1991; Angulo & Olivares, 2003; Simmons & Pogue, 2004; Muñiz et al., 2007; Angulo & Olivares, 2010; Quimbayo et al., 2010) (Plant Hardiness Zones 8-13; Fig. 2). It is estimated that the species could establish in the United States in areas corresponding to Zones 8-13.	High (3)
Risk Element #2: Host Range This species has been recorded on numerous hosts, including *Vitis vinifera* (Vitaceae), *Medicago sativa* (Fabaceae), *Capsicum frutescens* and *Solanum tuberosum* (Solanaceae), *Cynara scolymus* and *Helianthus* sp. (Asteraceae), *Allium* spp. (Liliaceae), *Fragaria ananassa* and *Malus pumila* (Rosaceae), *Simmondsia chinensis* (Simmondsiaceae), *Zea mays* and *Triticum* sp. (Poaceae), *Pistacia vera* (Anacardiaceae), *Beta vulgaris* (Chenopodiaceae), *Brassica oleracea* (Brassicaceae), *Dianthus caryophyllus* (Caryophyllaceae), *Feijoa sellowiana* (Myrtaceae), *Actinidia deliciosa* (Actinidiaceae) (Angulo & Olivares, 2003); *Alstroemeria* sp. (Amaryllidaceae), *Anemone japonica* (Ranunculaceae), *Antirrhinum majus* (Scrophulariaceae), *Astilbe* sp. (Saxifragaceae), *Lisianthus* sp. (Gentianaceae), *Bupleurum* sp. (Apiaceae) (Quimbayo et al., 2010); *Asparagus officinalis* (Liliaceae) (Gould & Huamán, 2006); and *Amaranthus cruentus* (Amaranthaceae) (Guerrero et al., 2000).	High (3)
Risk Element #3: Dispersal Potential Average fecundity has been reported to range from 572 (Arce de Hamity & Neder de Román, 1992) to 1038 (Larraín, 1996) eggs per female under laboratory conditions. Four generations per year have been recorded (FIA, 2004). Under ideal conditions, population growth in the species was calculated to be 14% per generation (Gould et al., 2005). Early-instar larvae may disperse locally on the wind (FIA, 2004). Long-distance spread is accomplished by the migration of adults, which has served to extend the species' range throughout much of South America (Paz et al., 2008), and via the movement of infested plant materials in commerce. The species has been intercepted at U.S. ports on grape and apple from Chile[a] (Santacroce, 1993), and various other commodities, including potato (Pogue & Simmons, 2008). This species thus exhibits high reproductive and dispersal potentials. Risk is estimated to be high.	High (3)
Risk Element #4: Economic Impact *Copitarsia decolora* is said to be the most economically important member of the genus (Simmons & Scheffer, 2004). It is one of the main pests of pearl lupin (*Lupinus mutabilis*), a legume crop of great importance in Bolivia, Ecuador, and Peru (Jacobsen & Mujica, 2006, 2008). In Peru, the species, known as "gusano de tierra" (soil worm), is a major pest of potato (Alcalá, 1978; Canales & Canto, 1999), attacking foliage and tubers, and is one of a complex of pests (including *Spodoptera eridania* Stoll and agromyzid leafminers) of broad bean (*Vicia faba*), that reduces yield by 50-60% (Gomez, 1972). Defoliation on the order of 60% has been reported in rape (*Brassica napus* var. *napus*), although with no appreciable effect on yield (Larraín, 1996). Infestation of other cole crops has been reported to result in loss of yield (Suárez-Vargas et al., 2006). The noctuid also is a significant pest of quinoa (*Chenopodium quinoa*) (Lamborot et al., 1999) and artichoke (*Cynara scolymus*) (Urra & Apablaza, 2005) in Chile, and infests cut flowers for export in Colombia (Moreno & Serna, 2006; Quimbayo	High (3)

Copitarsia decolora	**Risk Ratings**
et al., 2010). It occasionally is found on fruit trees, and the larvae may bore into immature fruits (Santacroce, 1993).[1] Selective pesticides, such as *Bacillus thuringiensis* var. *kurstaki*, and growth regulators (e.g., diflubenzuron, teflubenzuron, or triflumuron) are applied for control (FIA, 2004), which may increase costs of crop production. *Copitarsia* spp. are quarantine pests for Brazil, New Zealand, Paraguay, and Taiwan (Purdue University, 2011), suggesting that the introduction of *C. decolora* into the United States could result in a loss of foreign markets for various commodities. Risk attending the potential economic impact of this pest is estimated to be high.	
Risk Element #5: Environmental Impact *Copitarsia decolora* poses a potential threat to native plant species in the United States closely related to its known hosts, such as *Solanum drymophilum*, *S. incompletum*, *S. sandwicense*, *Amaranthus brownii*, *A. pumilus*, *Helianthus eggertii*, *H. paradoxus*, and *H. schweinitzii*, that are listed as Threatened or Endangered in 50 CFR §17.12 and occur within the moth's potential range in the United States. As *Copitarsia* spp. are reported to pose significant threats to agriculture (e.g., Venette & Gould, 2006), introduction of *C. decolora* into the United States might result in the initiation of chemical eradication programs. Also, as effective parasitoids of the moth are known (Neder de Roman & Arce de Hamity, 1991; Lamborot et al., 1995), its introduction could spur the initiation of biological control programs. Risk of adverse environmental consequences attending the introduction of this pest is estimated to be high.	High (3)

[a] Name recorded as *Copitarsia consueta* (Walker) (valid name: *C. incommoda* [Walker]; Simmons & Pogue, 2004), which likely is a misidentification of *C. decolora* (= *C. turbata*; Simmons & Pogue, 2004). Angulo & Olivares (2003) stated that *C. incommoda* and *C. turbata* are frequently mistaken for each other, as they are very similar in external appearance. According to these authors, *C. incommoda* does not occur in Chile and is not recorded on grape.

Epicaerus cognatus	**Risk Ratings**
Risk Element #1: Climate-Host Interaction *Epicaerus cognatus* is native to Mexico (Hernandez, 1937), where it has been reported to occur in mountainous areas of several states (Chihuahua, Puebla, Tlaxcala, Veracruz, Hidalgo, and México) and Mexico City (Anonymous, 1943, 1959) (Plant Hardiness Zones 8-11; Fig. 2). Its potential distribution in the United States is estimated to include a like range of hardiness zones.	High (3)
Risk Element #2: Host Range This weevil has been recorded on *Solanum tuberosum* and a wild species of *Solanum* (Wheeler et al., 1951; Anonymous, 1959). It was said to feed on several wild plants in Mexico (Anonymous, 1928a), but these were not identified.	Low (1)
Risk Element #3: Dispersal Potential Surprisingly little information is available on the biology of this serious pest. Females deposit eggs on leaves, usually in batches of 10-15, over several months; some individuals may continue oviposition into a second year (Hernandez, 1937). There is one generation per year (Anonymous, 1928a). Thus, a high biotic potential is not indicated. The weevil has been intercepted in potato tubers at U.S. ports numerous times since 1922 (Anonymous, 1959; Girard, 1974), indicating its potential to be moved long distances rapidly by human agency. Risk is judged to be medium.	Medium (2)
Risk Element #4: Economic Impact *Epicaerus cognatus* has long been a serious pest of potato in Mexico (Anonymous, 1928a). Damage is caused by larvae tunneling through, and feeding within, tubers	High (3)

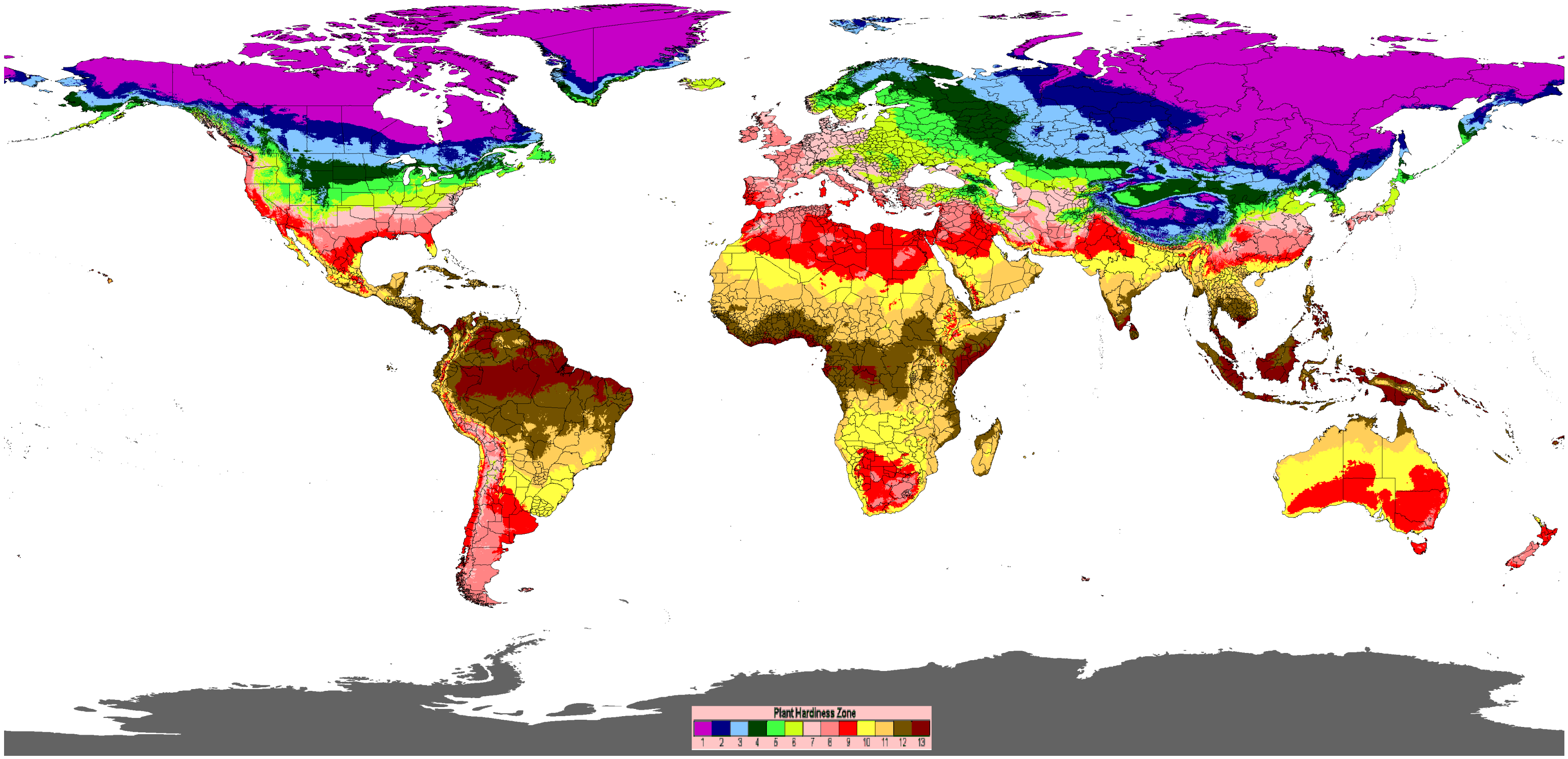


Figure 2. Plant hardiness zones of the world (modified from Magarey et al., 2008).

Epicaerus cognatus	**Risk Ratings**
(Anonymous, 1959), presumably reducing yield. Control measures commonly have included the application of insecticides to foliage (Hernandez, 1937) and soil fumigation (Anonymous, 1928b), which increase costs of crop production. The species is a quarantine pest for numerous countries, including Guatemala, Uruguay, Paraguay, Argentina, Brazil, Chile, Ecuador, Peru, and Korea (Purdue University, 2011), and Africa (APPO, 2003), suggesting that its introduction could result in a loss of foreign markets for U.S. potatoes. A high risk is indicated.	
Risk Element #5: Environmental Impact As it feeds on closely related species, *E. cognatus* has the potential to attack *Solanum drymophilum* in Puerto Rico, and *S. incompletum* and *S. sandwicense* in Hawaii, all listed as Endangered in Title 50, Part 17, Section 12 of the United States Code of Federal Regulations (50 CFR §17.12: Endangered and threatened plants). Introduction of the weevil probably would not result in the initiation of chemical control programs, as the broad-spectrum insecticides commonly used in U.S. potato production (Webb, 2006; Godfrey et al., 2008) likely would prove adequate for control purposes. There is no indication that the pest has been the target of biological control programs. Risk is estimated to be medium.	Medium (2)

Nacobbus aberrans	**Risk Ratings**
Risk Element #1: Climate-Host Interaction The potato pathotype of *N. aberrans* occurs only in Latin America. It has been reported from Mexico (Hidalgo, México, Morelos), and the Andean regions of Argentina (Jujuy, Salta), Bolivia (Chuquisaca, Cochabamba, La Paz, Oruro, Potosí, Tarija), Chile, Ecuador, and Peru (Manzanilla-López et al., 2002; Inserra et al., 2005; Lax et al., 2006; Suárez et al., 2009; Manzanilla-López, 2010) (Plant Hardiness Zones 7-11; Fig. 2). Its potential distribution in the United States is estimated to include Zones 7-11.	High (3)
Risk Element #2: Host Range[a] This organism attacks a variety of plant species in several families. Hosts include *Solanum tuberosum*, *S. lycopersicum*, *S. melongena*, *S. nigrum*, *Capsicum annuum*, *Physalis* sp., *Datura quercifolia* (= *D. ferox*), and *Nicotiana tabacum* (Solanaceae), *Beta vulgaris*, *Spinacia oleracea*, *Chenopodium album*, *C. quinoa*, and *Bassia scoparia* (= *Kochia scoparia*) (Chenopodiaceae), *Sysimbrium irio*, *Brassica rapa*, *B. nigra*, and *B. oleracea* (Brassicaceae), *Daucus carota* (Apiaceae), *Pisum sativum* (Fabaceae), *Cucumis sativus*, *Cucurbita pepo*, and *C. maxima* (Cucurbitaceae), *Amaranthus* sp. (Amaranthaceae), *Lactuca sativa* (Asteraceae), *Tropaeolum tuberosum* (Tropaeolaceae), *Ipomoea batatas* (Convolvulaceae), *Ullucus tuberosus* (Basellaceae), *Stellaria media* and *Spergula arvensis* (Caryophyllaceae), *Origanum vulgare* (Lamiaceae), and *Portulaca oleracea* (Portulacaceae) (Inserra et al., 2005).	High (3)
Risk Element #3: Dispersal Potential Fecundity in the potato pathotype of *N. aberrans* is reported to range from 231 to 372 eggs per female on potato; several generations per year may be produced if hosts are available (Canto, 1992). Rapid, local and long-distance dissemination of the organism is accomplished by the transport of infested tubers (Jatala & Bridge, 1990; Brodie et al., 1993). Soil adhering to tubers also may serve to spread the pathogen (Jatala & Kaltenbach, 1979). This pest has high reproductive and dispersal potentials. Risk is judged to be high.	High (3)

Nacobbus aberrans	**Risk Ratings**
Risk Element #4: Economic Impact Attack of roots by *N. aberrans* induces the growth of small, round galls or knots arranged in bead-like fashion (as in a rosary) (Brodie et al., 1993). Damage to potato results from a weakened and functionally reduced root system, which reduces tuber numbers and size (Brodie, 1984). Yield losses of 60-90% in potato crops have been reported (Inserra et al., 1985). In Bolivia, the nematode has been considered the most important constraint to potato production (Jatala & Bridge, 1990); losses valued at $52 million have been reported (Franco et al., 1999). It also has been reported to have a synergistic interaction with the wart fungus, *Synchytrium endobioticum*, in potato (Brodie et al., 1993), presumably increasing the severity of disease. Soil fumigants and granular nematicides have been used for control, but are expensive (Brodie et al., 1993), and thus increase costs of crop production. *Nacobbus aberrans* is a quarantine pest for at least 38 countries (Lehman, 2004), including Japan, Korea, Brazil, Israel, Turkey, the European Union, and Taiwan (Purdue University, 2011), suggesting that introduction of the potato pathotype into the United States could result in the loss of foreign markets to American producers of potatoes and other economically important crops. Risk is considered to be high.	High (3)
Risk Element #5: Environmental Impact The potato pathotype of *N. aberrans* has the potential to attack plants in the United States listed as Threatened or Endangered in 50 CFR §17.12. Potentially at risk are close relatives of recorded hosts, such as *Solanum drymophilum*, *S. incompletum*, *S. sandwicense*, *Cucurbita okeechobeensis* ssp. *okeechobeensis*, *Amaranthus brownii*, *A. pumilus*, and *Portulaca sclerocarpa*. Introduction of the potato pathotype into the United States probably would not result in initiation of chemical control programs, as the broad-spectrum nematicides (e.g., organophosphates, oxime carbamates) applied to the U.S. potato crop (Godfrey et al., 2008; Noling, 2009) have proven to be effective for its control (Hooker, 1981). However, its introduction could spur the initiation of biological control programs. Pérez-Rodríguez et al. (2007) demonstrated the potential of strains of the fungus, *Pochonia chlamydosporia* (Goddard) Zare & Gams (Ascomycetes: Hypocreales), as egg parasites, for control of the nematode. Risk is considered to be high.	High (3)

[a] Synonymy according to USDA-NRCS (2011).

***Ralstonia solanacearum* race 3**	**Risk Ratings**
Risk Element #1: Climate-Host Interaction Race 3 of *R. solanacearum* has been reported from Africa (Burundi, Cameroon, Canary Islands, Egypt, Ethiopia, Kenya, Libya, Mauritius, Nigeria, Réunion, Rwanda, South Africa, Tanzania, Uganda, Zambia), Asia (Bangladesh, China [Fujian, Guangdong, Guangxi, Hebei, Jiangsu, Zhejiang], India, Indonesia [Java], Iran, Japan [Kyushu], Lebanon, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand), Australia (New South Wales, Queensland, Victoria), Papua New Guinea, Europe (Belgium, France, Germany, Hungary, Netherlands, Russia, Slovakia, Slovenia, United Kingdom), North America (Costa Rica, Guadeloupe, Mexico [Chihuahua, Coahuila, Michoacan, Morelos, Queretaro, Sinaloa]), and South America (Argentina, Bolivia, Brazil, Chile, Colombia, Peru, Uruguay, Venezuela) (CABI, 1999; Németh et al., 2002; Boonsuebsakul et al., 2003; Elphinstone, 2005; EPPO, 2006b; Sanchez et al., 2008; Toukam et al., 2009; Khoodoo et al., 2010) (Plant Hardiness Zones 6-13; Fig. 2). The potential distribution of the species in the United States is estimated to extend across Zones 6-13.	High (3)

***Ralstonia solanacearum* race 3**	**Risk Ratings**
Risk Element #2: Host Range Hosts of the organism include *Solanum tuberosum*, *S. lycopersicum*, *S. melongena*, *Capsicum annuum*, and other, wild species of Solanaceae, *Pelargonium* × *hortorum* (Geraniaceae), *Polygonum capitatum* (Polygonaceae), *Amaranthus* spp. (Amaranthaceae), *Bidens pilosa* and *Erigeron floribundus* (Asteraceae), *Leucas martinicensis* (Labiatae), *Oxalis latifolia* (Oxalidaceae), *Spergula arvensis* (Caryophyllaceae), *Urtica dioica* (Urticaceae), *Brassica rapa* (Brassicaceae), *Chenopodium* spp. (Chenopodiaceae), *Momordica charantia* (Cucurbitaceae), *Phaseolus vulgaris* (Fabaceae), and *Portulaca oleracea* (Portulacaceae) (Tusiime et al., 1998; Wenneker et al., 1999; Pradhanang et al., 2000; Williamson et al., 2002; Janse et al., 2004).	High (3)
Risk Element #3: Dispersal Potential Under favorable conditions, infection by *R. solanacearum* race 3 in hosts, such as potato, may cause a rapid, general wilting, eventually resulting in plant death (Champoiseau et al., 2009). The pathogen is highly contagious (Jeffries, 1998) and highly pathogenic on potato (O'Brien & Rich, 1979). High temperatures and abundant soil moisture usually favor disease development, leading to epiphytotics in crops (Stevenson et al., 2001). Local, plant-to-plant spread of the pathogen may occur through the movement of bacteria in soil, on contaminated machinery, and via surface runoff water (Champoiseau et al., 2009). Rapid, long-distance dispersal is accomplished via the movement of infected plants by human agency. For example, Hayward (1991) suggested that the present broad geographic distribution of the organism, from a presumed origin in South America as a pathogen of potato, reflected the ease with which it is carried as latent infections in seed tubers. It is thought to have spread to western Europe in infected seed or early ware potatoes imported from Egypt and perhaps other countries in the eastern Mediterranean region (Mazzucchi, 1995; Janse, 1996) and in infected geranium cuttings from Kenya (Janse et al., 2004). This pathogen exhibits a high level of virulence and a significant potential for long-distance dispersal. Risk is judged to be high.	High (3)
Risk Element #4: Economic Impact *Ralstonia solanacearum* race 3 causes brown rot of potato (Champoiseau et al., 2009). Bacteria invade the vascular tissues of stems, roots, and tubers, causing them to turn brown and resulting in decay of tubers (Stevenson et al., 2001). Once initiated, infection may increase rapidly, and 100% of a crop may be lost (Silveira et al., 1998). Worldwide, losses total an estimated $950 million annually (Elphinstone, 2005; Milling et al., 2009). In areas, in which the organism has quarantine status, significant economic losses may result from the destruction of infected crops, costs of additional eradication efforts, and restrictions on further production on contaminated land (Elphinstone, 2005). For example, the eradication of *R. solanacearum* race 3 from the United States, following introduction of the pathogen in infected geraniums imported from Kenya and Central America in 2003, cost growers and regulators an estimated $10 million and involved the destruction of approximately 5 million plants (Swanson et al., 2005). Chemicals, in the form of soil fumigants and antibiotics, have been used for control in potato crops (e.g., Kabeil et al., 2008), but increase costs of production. *Ralstonia solanacearum* race 3 is an A2 quarantine pest for Europe (CABI/EPPO, 1997e) and a quarantine pest for Canada (EPPO, 2007), suggesting that its introduction could result in a loss of foreign markets for U.S. potatoes or tomatoes. Risk that introduction of this pathogen will result in a significant negative economic impact on U.S. agriculture is considered high.	High (3)
Risk Element #5: Environmental Impact Within its likely area of establishment in the United States, this pathogen has the	High (3)

***Ralstonia solanacearum* race 3**	**Risk Ratings**
potential to infect native plants designated as Threatened or Endangered in 50 CFR §17.12, such as *Solanum drymophilum*, *S. incompletum*, *S. sandwicense*, *Amaranthus brownii*, *A. pumilus*, *Portulaca sclerocarpa*, *Bidens micrantha* ssp. *kalealaha*, *B. wiebkei*, *Erigeron decumbens* var. *decumbens*, *E. maguirei*, *E. parishii*, and *E. rhizomalus*. Although chemical pesticides have proven largely to be ineffective or impractical against *R. solanacearum* race 3 (Saddler, 2005), evaluation of biotic agents for control of the pathogen has yielded encouraging results (e.g., Milling et al., 2004; Yamada et al., 2007), suggesting that its introduction could spur the initiation of biological control programs. Risk of an adverse impact on the environment resulting from the introduction of *R. solanacearum* race 3 is judged to be high.	

Rosellinia bunodes	**Risk Ratings**
Risk Element #1: Climate-Host Interaction *Rosellinia bunodes* (= *R. echinata* Massee; Farr & Rossman, 2010) is widespread in the subtropics and tropics. It has been reported from North America (Costa Rica, Cuba, Dominica, El Salvador, Grenada, Guadeloupe, Guatemala, Hispaniola, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Saint Kitts, Saint Lucia, Saint Vincent), South America (Brazil, Colombia, French Guiana, Guiana, Peru, Trinidad and Tobago, Venezuela), Africa (Central African Republic, Democratic Republic of the Congo, Uganda), and Asia (India [Nilgris, Maharashtra], Indonesia [Java, Sumatra], Japan, Malaysia, Philippines, Sri Lanka, Taiwan), and Papua New Guinea (Sivanesan & Holliday, 1972; CAB, 1985; Farr & Rossman, 2010) (Plant Hardiness Zones 7-13; Fig. 2). The potential distribution of the fungus in the United States is estimated to span Zones 7-13.	High (3)
Risk Element #2: Host Range[a] The fungus infects a variety of plant species in several families. Hosts include *Alnus acuminata* (Betulaceae) (Bermúdez & Carranza, 1990); *Artocarpus heterophyllus* (= *A. integer*) (Moraceae), *Persea americana* (Lauraceae), *Musa acuminata* (Musaceae), *Theobroma cacao* (Sterculiaceae), *Hevea brasiliensis* and *Manihot esculenta* (Euphorbiaceae), *Citrus* sp. (Rutaceae), *Coffea arabica* (Rubiaceae), *Colocasia esculenta* (= *C. antiquorum*) (Araceae), *Dryobalanops aromatica* (Dipterocarpaceae), *Zingiber* sp. (Zingiberaceae), *Hibiscus rosa-sinensis* (Malvaceae), *Holigarna longifolia* (Anacardiaceae), *Leucaena leucocephala* (= *L. glauca*) (Fabaceae), *Camellia sinensis* (Theaceae), *Piper nigrum* (Piperaceae), *Schleichera trijuga* (Sapindaceae), *Dioscorea* sp. (Dioscoreaceae), *Maranta arundinacea* (Marantaceae) (Sivanesan & Holliday, 1972); *Eugenia* sp. (Myrtaceae), *Jasminum officinale* (= *J. grandiflorum*) (Oleaceae), *Miconia* sp. (Melastomataceae), *Polyscias guilfoylei* (Araliaceae), *Urtica* sp. (Urticaceae) (Farr & Rossman, 2010); *Melia azedarach* (Meliaceae) (Wolar, 1972); *Cyathea arborea* (Cyatheaceae), *Capsicum frutescens*, *Cyphomandra betacea*, *Solanum tuberosum*, *S. melongena*, and *Nicotiana tabacum* (Solanaceae), *Eriobotrya japonica* (Rosaceae), *Erythroxylum coca* (Erythroxylaceae), *Euterpe* spp. (Arecaceae), *Ipomoea batatas* (Convolvulaceae), *Macadamia integrifolia* (= *M. ternifolia*) (Proteaceae), *Oxalis tuberosa* (Oxalidaceae), *Saccharum officinarum* (Poaceae), *Tabernaemontana divaricata* (Apocynaceae), *Tragopogon porrifolius* (Asteraceae) (Wellman, 1977); *Solenostemon scutellarioides* (= *Coleus blumei*) (Lamiaceae) (Villalobos et al., 2009); *Bixa orellana* (Bixaceae) (Spaulding, 1961); and *Myristica fragrans* (Myristicaceae) (Duke & duCellier, 1993).	High (3)

Rosellinia bunodes	**Risk Ratings**
Risk Element #3: Dispersal Potential Under conditions favorable for development of disease (e.g., soil constantly moist and rich in organic matter; Wellman, 1972), *R. bunodes* is an aggressive pathogen. Mycelial growth is vigorous, leading to a high rate of mortality in hosts (López-Duque & Fernández-Borrero, 1966). Plants may die so rapidly that leaves are not shed (South, 1921; Weber, 1973), suggesting a high degree of virulence. Oliveira et al. (2008) considered *R. bunodes* to be the most aggressive of *Rosellinia* species. The disease is propagated locally, from plant to plant, by growth and spread of mycelia through soil (Weber, 1973). The broad distribution of the pathogen, extending across four continents, suggests that it has been dispersed extensively by human agency. In coffee culture, for example, it was known to have been introduced into new areas on transplanted seedlings sourced from infected soil (Tucker, 1929). A high biotic potential and high capacity for dispersal are indicated for this species. Risk is estimated to be high.	High (3)
Risk Element #4: Economic Impact The fungus causes a root rot in hosts, initially resulting in wilt and proceeding to death of the entire plant (Sivanesan & Holliday, 1972). It causes severe root, stolon, and tuber infections in potato (Wellman, 1977). In Peru, *R. bunodes* is one of a complex of three *Rosellinia* species infecting potato, causing yield losses of 20-100% (Torres, 2002b). Losses of 20% have been recorded in cacao crops (Feitosa & Pimentel, 1991). It is one of the fungi that causes storage rots in yam (*Dioscorea*) tubers, resulting in severe losses (Kay, 1987). Application of fungicides may reduce the incidence of disease (Torres, 2002b), but increase costs of production. The fungus is a quarantine pest for Korea, Thailand (Purdue University, 2011), Asia and the Pacific region (EPPO, 2007), and Africa (APPO, 1999). Its introduction, therefore, could result in a loss of foreign markets for a variety of American agricultural products. Risk is considered to be high.	High (3)
Risk Element #5: Environmental Impact As it infects related species, *R. bunodes* poses a potential threat to plants listed in 50 CFR §17.12, such as *Manihot walkerae*, *Cyathea dryopteroides*, *Hibiscus arnottianus* ssp. *immaculatus*, *H. brackenridgei*, *H. clayi*, *H. waimeae* ssp. *hannerae*, *Eugenia haematocarpa*, *E. koolauensis*, *E. woodburyana*, *Solanum drymophilum*, *S. incompletum*, and *S. sandwicense*. Introduction of the fungus could result in the initiation of biological control programs. Results of field studies by Mendoza et al. (2003) suggested that microbial antagonists could be effective in controlling the pathogen. Risk is estimated to be high.	High (3)

[a] Synonymy according to USDA-NRCS (2011).

Rosellinia pepo	**Risk Ratings**
Risk Element #1: Climate-Host Interaction With the exception of disjunct populations in China (Hainan) and Papua New Guinea, the distribution of *R. pepo* is restricted to the New World tropics. The species has been reported from Barbados, Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Ecuador, French Antilles, Grenada, Guatemala, Jamaica, Mexico (Tabasco), Panama, Puerto Rico, Saint Lucia, Surinam, Trinidad, U.S. Virgin Islands, and Venezuela (Wellman, 1977; CABI, 1991; Farr & Rossman, 2010) (Fig. 2). We estimate its potential distribution in the United States is Plant Hardiness Zones 11-13.	Medium (2)
Risk Element #2: Host Range[a] Hosts include *Albizia malacocarpa*, *Canavalia* sp., and *Gliricidia sepium* (Fabaceae),	High (3)

Rosellinia pepo	**Risk Ratings**
Coffea arabica (Rubiaceae), *Theobroma cacao* (Sterculiaceae), *Citrus* sp. (Rutaceae), *Euterpe oleracea* (Arecaceae), *Manihot esculenta* (= *M. utilissima*) (Euphorbiaceae) (Farr & Rossman, 2010); *Persea americana* (Lauraceae), *Musa* sp. (Musaceae), *Artocarpus altilis* and *A. heterophyllus* (= *A. integer*) (Moraceae), *Colocasia esculenta* (= *C. antiquorum*) (Araceae) (Booth & Holliday, 1972); *Cedrela odorata* (= *C. mexicana*) (Meliaceae), *Eugenia* sp., *Psidium guajava*, and *Pimenta racemosa* (Myrtaceae), *Ipomoea batatas* (Convolvulaceae), *Jasminum officinale* (= *J. grandiflorum*) (Oleaceae), *Prunus* sp. (Rosaceae), *Schinus* spp. (Anacardiaceae), *Solanum tuberosum* (Solanaceae), *Camellia sinensis* (= *Thea sinensis*) (Theaceae) (Wellman, 1977); *Myristica fragrans* (Myristicaceae) (Weber, 1973); *Macadamia integrifolia* (Proteaceae) (Realpe et al., 2006); and *Garcinia mangostana* (Clusiaceae) (Oliveira et al., 2008).	
Risk Element #3: Dispersal Potential Results of studies on cacao by Waterston (1941) and Aranzazu (1996) suggested that *R. pepo* was mainly a saprophyte, and only facultatively parasitic, implying a low level of virulence. López-Duque & Fernández-Borrero (1966) found the fungus to be less virulent than *R. bunodes* in coffee plantations. Local dissemination of the pathogen from diseased to healthy plants is primarily through root-to-root contact (Oliveira et al., 2008). The broad distribution of the species, with populations recorded in three continents and Australasia, suggests that it's spread has been facilitated by human activity. Because a high biotic potential is not indicated, risk is estimated to be medium.	Medium (2)
Risk Element #4: Economic Impact The fungus causes a disease known as black root rot (Booth & Holliday, 1972), which results in severe root rots, and stolon and tuber infections in potato (Wellman, 1977). In Peru, *R. pepo* is one of a complex of three *Rosellinia* species infecting potato, causing yield losses of 20-100% (Torres, 2002b). The fungus also is the causal agent of a major disease of cacao (Ploetz, 2007). Incidence of disease in macadamia has been reported to range from 5-70% (Realpe et al., 2006). Various fungicides have been used to control *R. pepo* (Torres, 2002b; Ten Hoopen & Krauss, 2006), but increase costs of crop production. Introduction of the pathogen into the United States could result in a loss of foreign markets. It is a quarantine pest for Thailand (Purdue University, 2011) and for countries of the Asia and Pacific Plant Protection Commission and the Interafrican Phytosanitary Council (EPPO, 2007). Risk is considered to be high.	High (3)
Risk Element #5: Environmental Impact *Rosellinia pepo* poses a potential threat to tropical species listed in 50 CFR §17.12, such as *Canavalia molokaiensis*, *Eugenia haematocarpa*, *E. koolauensis*, *E. woodburyana*, *Solanum drymophilum*, *S. incompletum*, and *S. sandwicense*. Introduction of the fungus into the United States probably would not result in the initiation of programs for its control. Chemical control of *Rosellinia* diseases has proven largely to be ineffective and uneconomical; cultural methods have shown the most promise for managing disease incidence (Mendoza et al., 2003). Moreover, the broad-spectrum fungicides used to control the fungus (e.g., benomyl, carbendazim, thiabendazole, prochloraz, cyproconazole; Ten Hoopen & Krauss, 2006) are already in widespread use in U.S. agriculture (Davidse, 1986; Vinggaard et al., 2006; Peffer et al., 2007), including potato production (Powelson & Rowe, 2008), and likely would be perceived as adequate for control purposes. The efficacy of biological control apparently has been little investigated, if at all. Risk is estimated to be medium.	Medium (2)

[a] Synonymy according to USDA-NRCS (2011) and USDA (2010).

Synchytrium endobioticum	**Risk Ratings**
Risk Element #1: Climate-Host Interaction *Synchytrium endobioticum* is thought to have originated in the Andean region of South America, where it coevolved with the potato (Stevenson et al., 2001). It has been reported from Bolivia, Brazil, Falkland Islands, Peru, Mexico (México, Distrito Federal), Canada (Newfoundland, Prince Edward Island), Austria, Belarus, Belgium, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, Germany, Ireland, Italy, Latvia, Luxembourg, Montenegro, Netherlands, Norway, Poland, Romania, Russia (European), Slovakia, Slovenia, Sweden, Switzerland, United Kingdom, Ukraine, Armenia, Bhutan, India (Assam, Sikkim, West Bengal), Nepal, Turkey, Algeria, South Africa, Tunisia, and New Zealand (South Island) (Alvarez, 1976; CABI/EPPO, 1997a; CABI, 1998; Farr & Rossman, 2010) (Plant Hardiness Zones 3-13; Fig. 2). The potential distribution of the fungus in the United States is estimated to span a like range of plant hardiness zones.	High (3)
Risk Element #2: Host Range Hosts of the fungus are restricted to Solanaceae, and include *Solanum tuberosum*, *S. lycopersicum*, *S. sto1oniferum*, *S. vallis-mexici*, *S. jamesii*, *S. commersonii*, *S. chacoense*, other species of *Solanum*, and *Nicotiana* sp. (Weiss, 1925; Niederhauser, 1953; Chang & Rossman, 1987; Farr & Rossman, 2010).	Medium (2)
Risk Element #3: Dispersal Potential *Synchytrium endobioticum* produces copious numbers of motile zoospores to infect or re-infect hosts; under suitable conditions, there may be numerous generations per year (CABI/EPPO, 1997a). Gall formation in the host, a symptom of infection, proceeds rapidly, gall volume increasing as much as 1800-fold in little more than two weeks (Stevenson et al., 2001). Local spread of the pathogen through the soil or in surface water is slow, on the order of a few centimeters per year (Weiss, 1925). Short-distance dissemination also may be facilitated by wind (Hampson, 1996) or the movement of soil fauna (Hampson & Coombes, 1989). Rapid, long-distance dispersal occurs via the transport of infected potato tubers or contaminated soil in international trade (CABI/EPPO, 1997a). This species exhibits high reproductive and dispersal capacities. Risk is considered to be high.	High (3)
Risk Element #4: Economic Impact Potato wart disease, caused by *S. endobioticum*, is considered so important that, for decades, domestic and foreign quarantines have been in force worldwide to prevent its spread (CABI/EPPO, 1997a). Once the fungus is established in a field, an entire potato crop may be lost or otherwise rendered unmarketable; moreover, the fungus is so persistent that potatoes cannot be grown again safely for many years, nor can the land be used for any plants intended for export (Hampson, 1993; CABI/EPPO, 1997a). The fungus also has been reported to be a vector of potato virus X (Stevenson et al., 2001). Infected tubers develop galls (warts), which reduce their market value (Osterbauer, 2010). Introduction of *S. endobioticum* into the United States likely would result in a loss of domestic and foreign markets, as occurred in Canada after its detection there (Hampson et al., 1996; Clark et al., 2007). Where the fungus occurs, domestic movement of potatoes or other crops grown in infested soil often is restricted, resulting in a loss of sales (Chang & Rossman, 1987). The species is a quarantine pest for numerous countries, including Norway, Malaysia, Korea, Japan, China, Thailand, Australia, Argentina, Uruguay, Chile, Egypt, Israel, and the European Union (EPPO, 2007; Purdue University, 2011). Risk is considered to be high.	High (3)
Risk Element #5: Environmental Impact *Synchytrium endobioticum* poses a potential threat to *Solanum drymophilum*, *S. incompletum*, and *S. sandwicense*, listed as Endangered in 50 CFR §17.12. Introduction	Medium (2)

Synchytrium endobioticum	**Risk Ratings**
of the pathogen is not likely to stimulate the initiation of control programs. Resting spores, which may remain viable in soil for decades (Stevenson et al., 2001), are highly resistant to fungicides, and the only effective chemical agents have proven to be too toxic to crops and the soil microflora (Walker, 1976). Quarantine and sanitation measures, and the use of resistant potato cultivars are the principal means of disease control (CABI/EPPO, 1997a; Stevenson et al., 2001). There is no indication that the potential of biological control for managing the pest has been evaluated. Risk of negative environmental impacts attending the introduction of this species is estimated to be medium.	

Thecaphora solani	**Risk Ratings**
Risk Element #1: Climate-Host Interaction The distribution of *T. solani* is confined to the American tropics and subtropics. It has been reported from Bolivia, Chile (Regions I, IV, and IX), Colombia, Ecuador, Mexico (Aguascalientes, Baja California Norte, Chihuahua, Guanajuato, Jalisco), Panama, Peru, Venezuela (Jiménez, 1985; CABI/EPPO, 1997b; Andrade et al., 2004; Farr & Rossman, 2010) (Plant Hardiness Zones 8-13; Fig. 2). The fungus is prevalent in cool, mountainous regions, but also occurs in warmer, coastal areas (Stevenson et al., 2001). The potential range of the fungus in the United States is estimated to span Zones 8-13.	High (3)
Risk Element #2: Host Range Hosts are various species of Solanaceae, including *Solanum tuberosum*, *S. lycopersicum*, *S. stoloniferum*, and *Datura stramonium* (CABI/EPPO, 1997b; Farr & Rossman, 2010).	Medium (2)
Risk Element #3: Dispersal Potential *Thecaphora solani* does not appear to be an aggressive or highly virulent pathogen. Andrade et al. (2004) reported difficulty in culturing the fungus *in vitro* because of a low rate of germination of teliospores and an extremely low growth rate in mycelia. It is said to have a very low natural dispersal potential (CABI/EPPO, 1997b). Locally, irrigation water and grazing livestock may contribute to spread (Stevenson et al., 2001). Rapid, long-distance dispersal is effected by the transport of infected tubers of potato and other *Solanum* species (Mordue, 1970; CABI/EPPO, 1997b). The fungus has been intercepted at U.S. ports on at least 127 occasions on *Solanum* species from Mexico (USDA-APHIS Agricultural Quarantine Activity Systems Pest Interception Database [Pest ID]). Because a high biotic potential is not indicated for this species, risk is judged to be medium.	Medium (2)
Risk Element #4: Economic Impact *Thecaphora solani* causes the disease known as potato smut, which produces tumorous outgrowths (galls) on stolons, tubers, and underground portions of stems, and can reduce yields in potato crops by up to 85% (Stevenson et al., 2001). On tubers, galls vary in size from less than 1 mm to 4 mm or more in diameter, and their presence results in a loss in quality of the crop (Andrade et al., 2004). Chemicals have been used, as soil fumigants or tuber treatments, to control the fungus (Torres, 2002a; Wale et al., 2008), but increase costs of crop production. Introduction of the pathogen likely would result in a loss of foreign markets for U.S. potatoes. It is a quarantine pest for several countries, including Korea, Norway, Argentina, Brazil, China, Israel, Turkey, Taiwan, the European Union, and Russia (EPPO, 2007; Purdue University, 2011). Risk is estimated to be high.	High (3)
Risk Element #5: Environmental Impact *Thecaphora solani* poses a potential threat to *Solanum drymophilum*, *S. incompletum*, and *S. sandwicense*, listed as Endangered in 50 CFR §17.12. Introduction of the	Medium (2)

Thecaphora solani	**Risk Ratings**
pathogen is not likely to stimulate the initiation of control programs. Being soil-borne, once established, its eradication is considered practically impossible (CABI/EPPO, 1997b). A variety of fungicides has been evaluated for control of the disease, but with limited success; some have achieved a reduction in the severity of infection, but not the elimination of the pathogen (Wale et al., 2008). Management of the disease generally has relied on cultural methods, such as sanitation, long rotation cycles, and the use of clean seed, and resistant cultivars (Stevenson et al., 2001). The broad-spectrum fungicides currently used in U.S. potato production (e.g., Godfrey et al., 2008; Olson et al., 2010) probably would be perceived as adequate for control purposes. There is no indication that the potential of biological control for managing the pest has been evaluated. Risk is considered to be medium.	

Table 5. Risk rating for Consequences of Introduction (potato, *Solanum tuberosum*, from Mexico).

Pest	**Risk Element**					**Cumulative Risk Rating**
	1	**2**	**3**	**4**	**5**	
Copitarsia decolora	High (3)	High (3)	High (3)	High (3)	High (3)	High (15)
Epicaerus cognatus	High (3)	Low (1)	Med (2)	High (3)	Med (2)	Medium (11)
Nacobbus aberrans	High (3)	High (3)	High (3)	High (3)	High (3)	High (15)
Ralstonia solanacearum race 3	High (3)	High (3)	High (3)	High (3)	High (3)	High (15)
Rosellinia bunodes	High (3)	High (3)	High (3)	High (3)	High (3)	High (15)
Rosellinia pepo	Med (2)	High (3)	Med (2)	High (3)	Med (2)	Medium (12)
Synchytrium endobioticum	High (3)	Med (2)	High (3)	High (3)	Med (2)	High (13)
Thecaphora solani	High (3)	Med (2)	Med (2)	High (3)	Med (2)	Medium (12)

2.6. Likelihood of Introduction—Quantity Imported and Pest Opportunity

Likelihood of introduction is a function of both the quantity of the commodity imported annually and pest opportunity, which consists of five criteria that consider the potential for pest survival along the pathway (USDA, 2000). Risk values determined for the likelihood of introduction of each pest are summarized below (Table 8).

2.6.1. Quantity of commodity imported annually

The rating for the quantity imported annually usually is based on the amount reported by the exporting country, and is converted into standard units of 40-foot-long shipping containers. The quantity of potatoes to be imported annually from Mexico into the United States has not been communicated. However, if it is assumed that tuber production will increase to a level permitting exports to the United States to equal, at a minimum, current production (≈ 1.6 million tonnes; FAO, 2011b), volume will exceed the capacity of 64,000 40-foot-long shipping containers. Risk is estimated to be high.

2.6.2. Survive post-harvest treatment

Specific post-harvest treatment of potato tubers in Mexico has not been communicated. However, *Epicaerus cognatus*, as an internal feeder (Anonymous, 1959), would be expected to have a high probability (> 10%; USDA, 2000) of surviving minimal post-harvest treatment, such as washing and culling, especially if infestation of the tuber had not progressed to such an advanced stage that damage was obvious. Infested potatoes may not show external damage, such as larval entrance holes (Anonymous, 1959). Similarly, external symptoms may or may not be visible on potato tubers infected by *Synchytrium endobioticum* and *Ralstonia solanacearum* race 3, depending on the state of development of the disease (Chang & Rossman, 1987; Janse, 2004), damage being confined, at least initially, to internal tissues (O'Brien & Rich, 1979; CABI/EPPO, 1997a). Tubers containing juveniles and adults of *Nacobbus aberrans* usually show no symptoms of infection (Lehman, 2004; Manzanilla-López et al., 2004). The nematodes may penetrate tubers to a depth of 1-2 mm (Canto, 1992). Thus, these pests may go undetected by visual inspection and are likely to be protected from any disinfestation or disinfection operation that treats the tuber surface only. They also are estimated to have a high probability of surviving post-harvest treatment.

Damage caused by the feeding of *Copitarsia decolora* on or within tubers is readily apparent and may be severe (Alcázar et al., 2004). Similarly, symptoms of disease in tubers infected by the remaining fungi tend to be obvious at harvest. Tubers infected by *Rosellinia* spp. are covered superficially, either partially or totally, by mycelial growth (Torres, 2002b), and frequently rot before harvest (Stevenson et al., 2001). Tubers infected by *Thecaphora solani* are misshapen, with warty swellings (galls) on the surface (Barrus & Muller, 1943; CABI/EPPO, 1997b). After initial infection, gall development proceeds throughout the growing season (Mordue, 1970). Tubers affected by these pests are likely to be detected and culled at harvest or in the packinghouse. The likelihood of these pests' surviving post-harvest treatment, therefore, is considered low.

2.6.3. Survive shipment

The conditions under which potato will be shipped from Mexico to the United States have not been communicated. Interception records may provide some indication of the ability of pest organisms to survive shipping conditions. A large number of live organisms intercepted with commodities at U.S. ports-of-entry suggests that environmental conditions in shipping containers and aircraft cargo holds are favorable for their survival (e.g., Pasek, 2000). By the same reasoning, low rates of interception may suggest that certain pests do not survive well conditions under which commercial produce from Mexico is shipped. There were no interception records for most of the pests of concern, and but a single interception recorded for *Thecaphora solani* (Table 6). These organisms are estimated to present a low risk of surviving shipment (< 0.1%; USDA, 2000). Between 1992 and 2010, *Copitarsia* spp. were intercepted in significant numbers in cargo from Mexico (Table 6). Risk of their surviving shipment is considered to be high.

Table 6. Interceptions at U.S. ports of pests of concern on or in various agricultural commodities in cargo from Mexico.[a]

Pest	Individuals or Infections Intercepted (no.)
Copitarsia spp.[b]	733
Epicaerus cognatus	0
Nacobbus aberrans	0
Ralstonia solanacearum	0

Pest	Individuals or Infections Intercepted (no.)
Rosellinia spp.	0
Synchytrium endobioticum	0
Thecaphora solani	1

[a]Data from the USDA-APHIS Agricultural Quarantine Activity Systems Pest Interception Database (Pest ID). Last access: April 2011.
[b]Records include *C. decolora*. All species of *Copitarsia* occurring in Mexico are members of the *C. decolora* species group, a complex of cryptic species with very similar morphological traits (Angulo & Olivares, 2003; Pogue & Simmons, 2008), and are assumed to have similar biology.

2.6.4. Not detected at a port-of-entry

As with assessing the probability that potato pests will survive post-harvest treatment, estimating the likelihood that these pests will not be detected at a port-of-entry involves consideration of pest biology and degree of concealment. *Epicaerus cognatus*, as an internal feeder, would be expected to have a high probability of evading detection, especially if infestation of the tuber had not progressed to such an advanced stage that damage was obvious. Infested potatoes may not show external damage, such as larval entrance holes (Anonymous, 1959). Similarly, external symptoms may or may not be visible on potato tubers infected by *Synchytrium endobioticum* and *Ralstonia solanacearum* race 3, depending on the state of development of the disease (Chang & Rossman, 1987; Janse, 2004), damage being confined, at least initially, to internal tissues (O'Brien & Rich, 1979; CABI/EPPO, 1997a). There is no galling or deformation associated with *N. aberrans* infection of tubers (Jatala & Bridge, 1990). Further, Lehman (2004) has suggested that, as a result of recent trade agreements between the United States and countries, in which the potato pathotype of *N. aberrans* occurs, vegetable hosts of the organism have been moved in trade with minimal regulatory inspection. These pathogens also are likely to have a high probability of passing undetected at a port-of-entry.

Damage caused by the feeding of *Copitarsia decolora* on or within tubers is readily apparent (Alcázar et al., 2004), and likely would betray the presence of larvae within tubers. Similarly, symptoms of disease in tubers infected by the remaining fungi tend to be obvious at harvest and beyond. Tubers infected by *Rosellinia bunodes* and *R. pepo* are covered superficially, either partially or totally, by mycelial growth, and exhibit signs of rot (Torres, 2002b). Tubers infected by *Thecaphora solani* are misshapen, with warty swellings (galls) on the surface (Barrus & Muller, 1943; CABI/EPPO, 1997b). After initial infection, gall development proceeds throughout the growing season (Mordue, 1970). Because of the highly visible damage they do to potato tubers, these pests are likely to be detected at a port-of-entry. Risk is estimated to be low.

2.6.5. Moved to a habitat suitable for survival

Because of its high nutritive value, versatility in recipes, and perceived health benefits, potato tends to have broad appeal among consumers (Bohl & Johnson, 2010). Hence, potato tubers from Mexico are likely to be sold in every state. However, under the assumption that demand for the vegetable is proportional to the size of the consumer population in potential markets, imports might be concentrated more in some regions of the United States than in others, not all of which may have climatic conditions conducive to pest survival. Every state, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands include areas within Plant Hardiness Zone 3 or higher (Fig. 3). Assuming that infestations or infections by all pests will be randomly distributed among

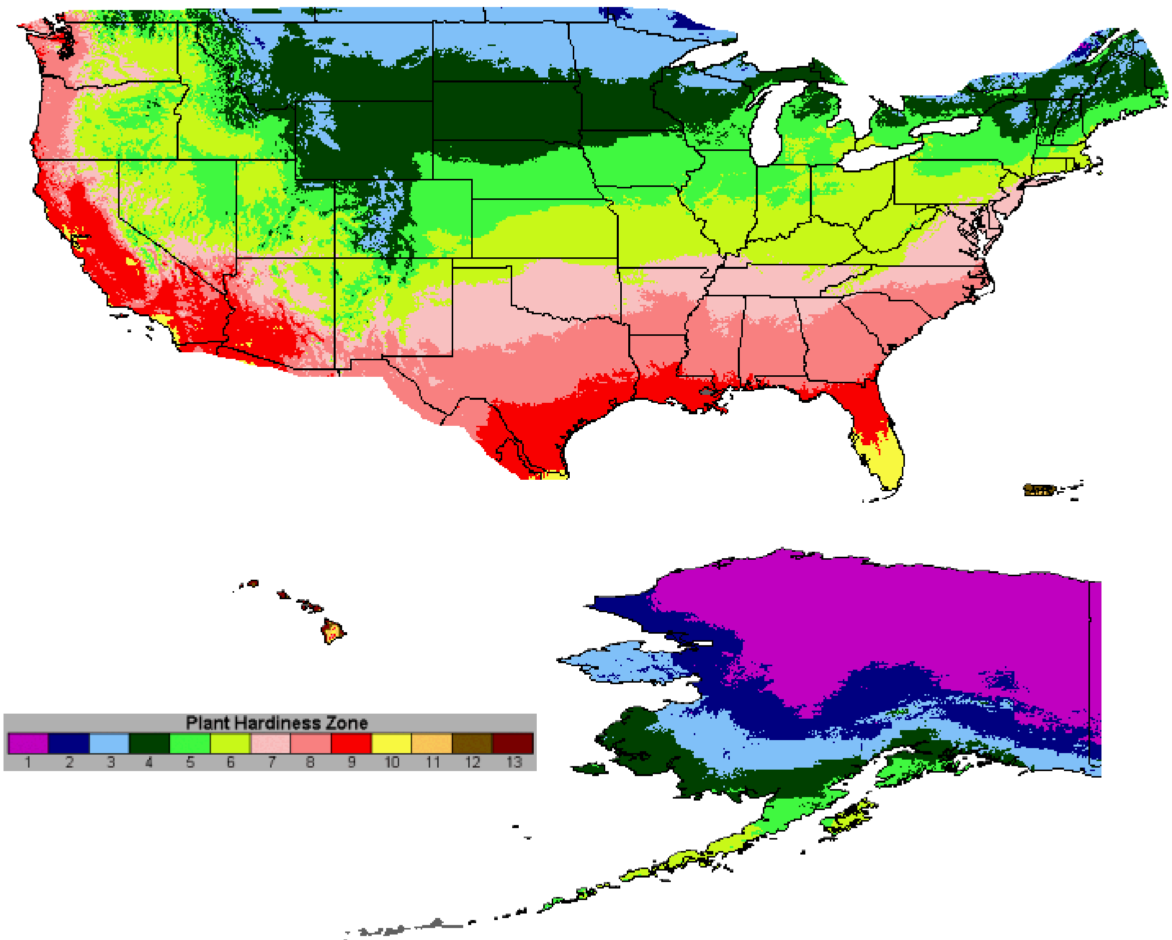


Figure 3. Plant hardiness zones in the United States (modified from Magarey et al., 2008).

consignments, because it has the potential to found populations in parts of the United States comprising 100% of likely markets for potatoes (Table 7), *Synchytrium endobioticum* is estimated to have a high probability of moving to habitat suitable for survival. Although not quite as eurytopic, *Ralstonia solanacearum* race 3 has the potential to become established in a broad proportion of the United States (Zones 6 and above), comprising 92% of likely markets for potatoes (Table 7). It also is considered to have a high probability of moving to habitat suitable for survival. The bacterium probably would be excluded only from those areas of the country with a continental climate, which include several major potato-producing states (NASS, 2010). Results of experiments reported by Scherf et al. (2010) suggested that *R. solanacearum* race 3 was unlikely to become established in commercial potato-growing regions of the northern United States because it is unable to survive frequent near-freezing temperature fluctuations, even when sheltered in host plant tissue.

Habitats considered suitable for the remaining pests, with the exception of *Rosellinia pepo*, (within Zones 7 and above and 8 and above) occur in 26 states and the District of Columbia, and 16 states, respectively, plus Puerto Rico and the Virgin Islands, comprising a much narrower range (47-72%) of likely markets for potatoes (Table 7). However, three of the most populous states (California, Florida, and Texas; USCB, 2010: Table 12) occur, at least partially, within Zones 7-8 and above, and are likely to constitute large markets for potatoes. The probability that these species will move to suitable habitat is estimated to be medium.

Distributional data suggest that *R. pepo* has narrow climatic tolerances, and potentially could become established in approximately 2% of likely markets for potatoes (Table 7). This species is estimated to have a low probability of moving to suitable habitat.

Table 7. Proportion of likely potato markets within potential pest range in the United States.[a]

Pest	Estimated Potential U.S. Range (Plant Hardiness Zones)[b]	Likely Potato Markets Within Range[c] (percent)
Copitarsia decolora	8-13	47
Epicaerus cognatus	8-11	47
Nacobbus aberrans	7-11	72
Ralstonia solanacearum race 3	6-13	92
Rosellinia bunodes	7-13	72
Rosellinia pepo	11-13	2
Synchytrium endobioticum	3-13	100
Thecaphora solani	8-13	47

[a]Includes District of Columbia, Puerto Rico, and the U.S. Virgin Islands.
[b]From Section 5: Consequences of Introduction.
[c]Population data from USCB (2010: Tables 12 and 1312).

2.6.6. Come into contact with host material suitable for reproduction

Assessment of the probability that an introduced plant pest will come into contact with suitable host material must take into account not only the availability, in time and space, of its host plants and of the particular plant parts fed upon or used for reproduction, but also the pest's inherent powers of movement allowing it to find and colonize hosts successfully.

In Mexico, potato production occurs between March and November in the coastal plains, and between April and September in the highlands (Haverkort & Wiersema, 2007). Hosts in the United States, if present in an area of pest introduction, could be available in suitable condition (i.e., with new vegetative growth or developing fruit) during much of this period (e.g., April-October or longer), particularly in southern areas of the country. However, additional factors must be considered to gauge the likelihood that an introduced organism will find hosts suitable for survival and reproduction.

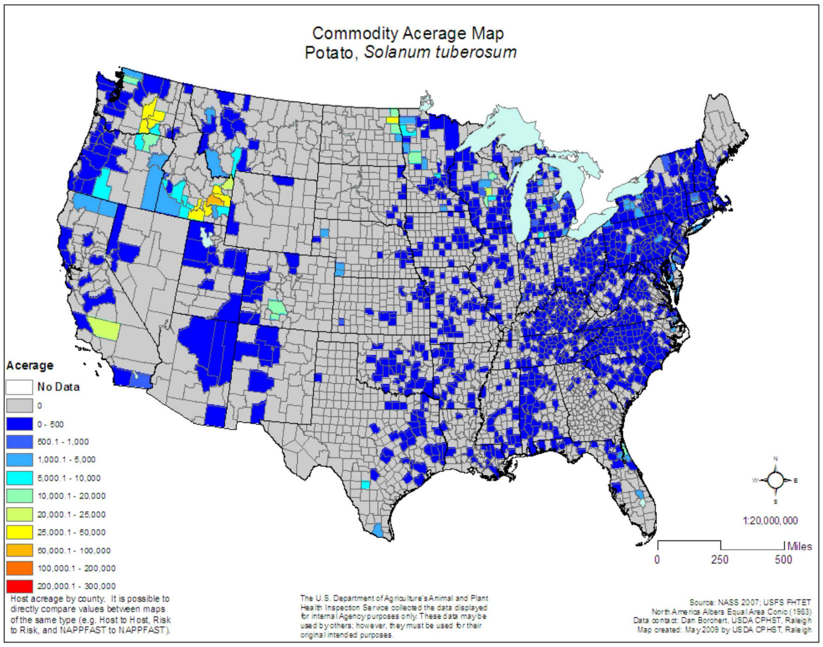
Even if they succeed in reaching a new region, immigrant organisms are likely to be destroyed quickly by a multitude of physical or biotic agents present in the environment. Data quantifying the number of species actually dispersed from their native ranges, the number arriving at a new site, and the number of these that subsequently perish are almost entirely lacking, but, based on the number of species that have been collected only once far beyond their native range, the local extinction of immigrants soon after their arrival must be enormous (Mack et al., 2000). Other examples serve to illustrate the poor prospects for establishment and the extinction risks faced by small adventive populations. In a study of the success of various groups of invading organisms, Williamson & Fitter (1996) found that no greater than 1% of insects introduced into a new region became established. Controlled studies of insects introduced for biological weed control, in which conditions for establishment generally were optimal, showed that small founding populations (at densities likely to be greater than those typically infesting imported commodities, such as fruits and vegetables) tended to become extinct within three years of introduction (Memmott et al., 1998; Grevstad, 1999). The probability, therefore, that pest organisms entering the United States in consignments of fruits and vegetables will be successful in finding suitable hosts might be assumed *a priori* to be low.

Potatoes will be imported for consumption only. Thus, the tubers would be expected to have only a limited probability of introduction directly into the natural or agricultural environments, in which hosts might be found. The Pest ID database, maintained by APHIS, provides a record of interceptions at U.S. ports of quarantine pests on various commodities (fruits and vegetables, plant propagative material). As only a small percentage of goods passing through the ports is inspected (< 2%; NRC, 2002), a reasonable assumption is that at least some of these pests also are present in the many more items that are entering the country without inspection (cf. Work et al., 2005), and are thus presented with opportunities to become established. Yet there is no record of establishment for many of these pests. For example, since 1984, at least 173 and 124 specimens of *Copitarsia decolora* and *Thecaphora solani*, respectively, have been intercepted on various commodities (many in cargo) for consumption (Pest ID). During that period, these pests have failed to become established in the United States.

Potato appears to be the main host of *Epicaerus cognatus* (Anonymous, 1928a; Hernandez, 1937), although another, unidentified wild species of *Solanum* ("wild potato") also has been recorded (Wheeler et al., 1951). Production of the crop in areas of the United States, in which climatic conditions favor survival of *E. cognatus* (Plant Hardiness Zones 8-11; Table 7), is generally sparse (Fig. 4). The probability that small numbers of the weevil, arriving with consignments of potato tubers from Mexico, would be able readily to locate suitable hosts likely is low.

In a study designed to examine pest survival on imported commodities for consumption, Gould & Huamán (2006) found that discarded produce (e.g., asparagus) was unlikely to support development of *C. decolora* larvae. All of the individuals tested died before completing development to the adult stage, although a small percentage of first instars escaped from trash bins. However, given the myriad abiotic and biotic mortality factors in the environment arrayed against neonate Lepidoptera (Zalucki et al., 2002), their prospects for survival and successful establishment would not be encouraging. Also, because they lack wings, larvae of *C. decolora* have limited powers of dispersal, and thus lack the ability to locate hosts quickly.

Plant material for consumption, such as fresh fruit and vegetables, is considered generally to pose a low risk as a pathway for establishment of fungi, in contrast to propagative material (Palm & Rossman, 2003). For fungi, successful establishment by wind-blown spores is influenced by the quantity of spores produced, the number of spores that becomes airborne, wind direction and speed, the ability of spores to survive adverse environmental conditions, and the availability of susceptible hosts (Roberts & Boothroyd, 1972). An optimal set of conditions enabling *Rosellinia* *bunodes*, *R. pepo*, *Synchytrium endobioticum*, and *Thecaphora solani* to infect hosts in the United States is considered unlikely to occur.



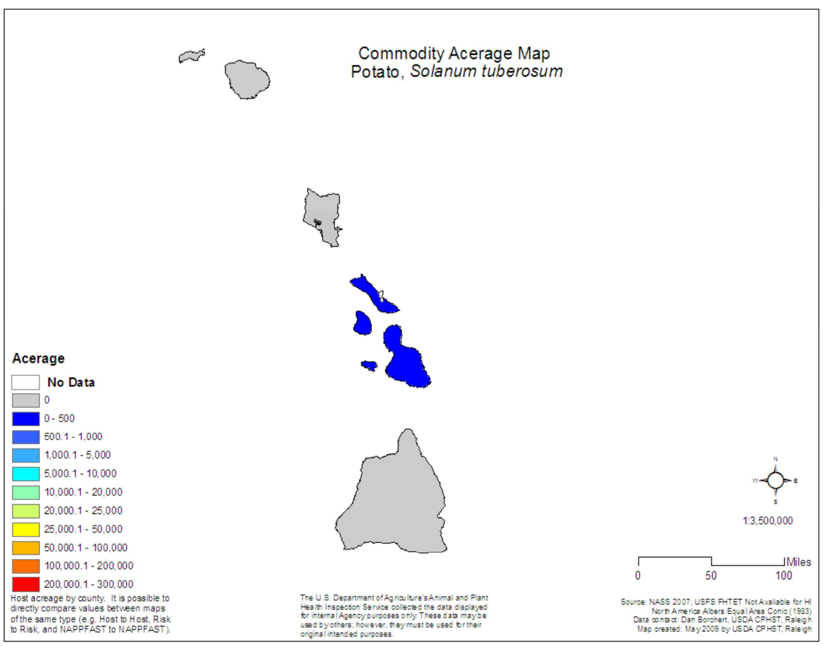


Figure 4. Commercial potato (*Solanum tuberosum*) production areas in the United States (source: NCSU/APHIS Plant Pest Forecast System [NAPPFAST]).

For all of the above reasons, the probability that *E. cognatus*, *C. decolora*, the *Rosellinia* species, *S. endobioticum*, and *T. solani* will come into contact with suitable host material is estimated to be low.

Hosts of *Ralstonia solanacearum* race 3 are widespread in the United States, many of them growing wild as uncultivated, weedy species (USDA-NRCS, 2011). The bacterium spreads through soil, and often is present as symptomless infections in weed hosts (Stevenson et al., 2001). It can survive in soil for years, forming a reservoir of inoculum, from which it can disperse (Champoiseau et al., 2009). Introduction of infected potato tubers into landfills could result in establishment of the pathogen in domestic populations of several of its weedy hosts, such as species of *Amaranthus* and *Chenopodium*, *Urtica dioica*, and *Portulaca oleracea*. Risk is estimated to be high.

Hosts of *Nacobbus aberrans* also are broadly distributed in the United States, many of them growing wild as uncultivated, weedy species (USDA-NRCS, 2011). Nematodes may survive in stored potato tubers (Manzanilla-López et al., 2002) and soil (Jatala & Kaltenbach, 1979; Brodie et al., 1993) for an extended period. Weed hosts, such as *Spergula arvensis*, are said to favor survival and establishment of *N. aberrans* in the absence of a potato crop (Brodie et al., 1993). The second-stage juveniles are described as highly motile and migratory (Manzanilla-López et al., 2002). Introduction of infected potato tubers into landfills could result in establishment of the pathogen in domestic populations of several of its weedy hosts, such as species of *Amaranthus* and *Chenopodium*, *S. arvensis*, and *Portulaca oleracea*. Risk is estimated to be high.

Table 8. Risk rating for Likelihood of Introduction (potato, *Solanum tuberosum*, from Mexico).

Pest	**Quantity Imported Annually**	**Survive Postharvest Treatment**	**Survive Shipment**	**Not Detected at Port-of-Entry**	**Moved to Suitable Habitat**	**Contact with Host Material**	**Cumulative Risk Rating**
Copitarsia decolora	High (3)	Low (1)	High (3)	Low (1)	Med (2)	Low (1)	Medium (11)
Epicaerus cognatus	High (3)	High (3)	Low (1)	High (3)	Med (2)	Low (1)	Medium (13)
Nacobbus aberrans	High (3)	High (3)	Low (1)	High (3)	Med (2)	High (3)	High (15)
Ralstonia solanacearum race 3	High (3)	High (3)	Low (1)	High (3)	High (3)	High (3)	High (16)
Rosellinia bunodes	High (3)	Low (1)	Low (1)	Low (1)	Med (2)	Low (1)	Low (9)
Rosellinia pepo	High (3)	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	Low (8)
Synchytrium endobioticum	High (3)	High (3)	Low (1)	High (3)	High (3)	Low (1)	Medium (14)
Thecaphora solani	High (3)	Low (1)	Low (1)	Low (1)	Med (2)	Low (1)	Low (9)

2.7. Conclusion—Pest Risk Potential and Pests Requiring Phytosanitary Measures

The summation of the values for the consequences of introduction and the likelihood of introduction for each pest yields Pest Risk Potential (USDA, 2000) (Table 9). This is an estimate of the unmitigated risk associated with this importation.

For pests with a Pest Risk Potential value of Low, mitigation typically will not be required, as port-of-entry inspection is expected to provide sufficient phytosanitary security (USDA, 2000). A value within the Medium range indicates that specific phytosanitary measures may be necessary. High Pest Risk Potential means that specific phytosanitary measures are strongly recommended, and that mere port-of-entry inspection is not considered sufficient to provide phytosanitary security. The selection of appropriate phytosanitary measures to mitigate risk is undertaken as part of Risk Management, and is not addressed in this document.

Table 9. Pest Risk Potential.

Pest	Consequences of Introduction	Likelihood of Introduction	Pest Risk Potential
Copitarsia decolora	High (15)	Medium (11)	Medium (26)
Epicaerus cognatus	Medium (11)	Medium (13)	Medium (24)
Nacobbus aberrans	High (15)	High (15)	High (30)
Ralstonia solanacearum race 3	High (15)	High (16)	High (31)
Rosellinia bunodes	High (15)	Low (9)	Medium (24)
Rosellinia pepo	Medium (12)	Low (8)	Medium (20)
Synchytrium endobioticum	High (13)	Medium (14)	High (27)
Thecaphora solani	Medium (12)	Low (9)	Medium (21)

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