

**Importation of Fresh Fruit of Avocado,
Persea americana Miller var. 'Hass', into the Continental
United States from Colombia**

A Pathway-Initiated Risk Assessment

October 31, 2016

Version 4

Agency Contact:

Plant Epidemiology and Risk Analysis Laboratory
Center for Plant Health Science and Technology

United States Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
1730 Varsity Drive, Suite 300
Raleigh, NC 27606

Executive Summary

The Republic of Colombia requested approval for imports into the continental United States of fresh avocado fruit, *Persea americana* Mill. var. ‘Hass’, without a peduncle. Because this commodity has not been imported from Colombia before, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) conducted a pathway-initiated risk assessment to determine the risks associated with importing these ‘Hass’ avocados. We developed a list of pests known to occur in Colombia and associated with avocado based on the scientific literature, port-of-entry pest interception data, and information provided by the Colombian Ministry for Agriculture and Rural Development, and the Colombian Agricultural Institute (ICA). Commercial ‘Hass’ avocado is a conditional non-host for the fruit flies, *Anastrepha fraterculus*, *A. striata*, and *Ceratitis* spp. Thus, we did not list these organisms in the assessment. We determined that three quarantine arthropod pests were likely to follow the pathway, and qualitatively analyzed them to determine the unmitigated risk posed to the United States.

Pest	Taxonomy	Pest Risk Potential
<i>Heilipus lauri</i> Boheman	Coleoptera: Curculionidae	High
<i>Heilipus trifasciatus</i> (Fabricius)	Coleoptera: Curculionidae	High
<i>Stenoma catenifer</i> Walsingham	Lepidoptera: Elasmobranchidae	High

All pests were rated High and for pests with High pest risk potential, mitigations beyond port-of-entry inspection are recommended. Detailed examination and choice of appropriate phytosanitary measures to mitigate pest risk are part of the pest risk management phase within APHIS and are not addressed in this document.

Table of Contents

Executive Summary	ii
1. Introduction.....	1
1.1. Background	1
1.2. Standard Harvest and Postharvest Processing	1
1.3. Production in Colombia	2
2. Risk Assessment	2
2.1. Initiating Event: Proposed Action.....	2
2.2. Assessment of Weed Potential of Avocado	2
2.3. Current Status, Decision History, and Pest Interceptions	4
2.4. Pest Categorization—Identification of Pests of Avocado in Colombia.....	4
2.5. Quarantine Pests Likely to Follow the Pathway	45
2.6. Risk Assessment	45
2.7. Pest Risk Potential and Conclusion	50
3. Authors, Contributors, and Reviewers	51
4. Literature Cited	51
5. Appendices.....	68
Appendix A. Harvest, post-harvest practices, and standard packinghouse procedures described for ‘Hass’ avocados produced in Colombia.	68
Appendix B. Countries with permitted entry of Avocados into the United States.	70
Appendix C. Current requirements for the entrance of <i>Persea americana</i> cv. Hass from different counties into the United States	71
Appendix D. Decision sheets for <i>Persea americana</i> cv. Hass	72
Appendix E. Pest interceptions on <i>Persea americana</i> entering the United States	78
Appendix F. Pests reported on avocado, <i>Persea Americana</i> , and present in Colombia.....	100
Appendix G. Information on Avocado Botany, Origin, and Production	109

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 avocado fruits, *Persea americana* Mill. var. 'Hass', without a peduncle from Colombia into the continental United States.

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 fresh avocado fruits, *Persea americana* Mill. var. 'Hass', without peduncle from Colombia. 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: More likely to not occur than 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. Standard Harvest and Postharvest Processing

Harvest, post-harvest practices, and standard packinghouse procedures are described for avocado fruits produced in Colombia (Arevalo, 2011; Consejo Nacional del Aguacate, 2011a; Londoño, 2006; NTC 5209 ICONTEC, 2003) (Appendix A). Washing, brushing, grading and culling in the above mentioned standard activities are carried out in Colombia and are relevant to assure a quality exportation commodity.

1.3. Production in Colombia

In Colombia, the production areas and yield for avocado increased from 2008 to 2010 (Table 1; Agronet, 2011). The main importer of Colombian avocados is Holland, with 51.5 tons imported in 2010 (Agronet, 2011).

In 2010, commercial ‘Hass’ avocado in Colombia was growing on 5,696 ha (14,075 acres). Currently, 20,733 tons per year are harvested from an area of 1,994 ha (4,927 acres). It is expected that 100% of the total planted acreage will be under full production within two years (Consejo Nacional del Aguacate, 2011b).

2. Risk Assessment

We used the *Guidelines for Pathway-Initiated Pest Risk Assessments, Version 5.02* for this assessment (PPQ, 2000). We combine the first five risk elements to estimate the Consequences of Introduction. To estimate the risk associated with the Likelihood of Introduction we evaluated the pests based on six sub-elements. We used the Consequences of Introduction and the Likelihood of Introduction values together to estimate the Pest Risk Potential.

2.1. Initiating Event: Proposed Action

We conducted this commodity-based, pathway-initiated risk assessment in response to a request made by the Instituto Colombiano Agropecuario (ICA) of Colombia (ICA, 2005) to the USDA to authorize the importation of fresh ‘Hass’ avocado fruit (ICA, 2005) into the continental United States. The importation is a potential pathway for the introduction of plant pests. USDA has regulatory authority for the importation of fruits and vegetables from foreign sources into the United States (7 CFR § 319, 2011).

2.2. Assessment of Weed Potential of Avocado

The results of the weed screening for avocado did not prompt a weed-initiated risk assessment (Table 2).

Table 1. Total avocado production areas and yield in Colombia (Agronet, 2011).

Year	Production areas in ha (acres)	Yield (MT)
2008	25,640 (63,357 acres)	170,763
2009	27,297 (67,452 acres)	183,883
2010	30,511 (75,394 acres)	201,869

Table 2. Assessment of weed potential of avocado

Scientific name: *Persea americana* Miller var. ‘Hass’ (Ploetz et al., 1994) [Lauraceae]

Common name: Avocado, aguacate, palta (Wiersema and León, 1999).

Synonyms: *Persea americana* Mill. var. ‘Hass’ is a cultivar from the Guatemalan race (*P. americana* var. *guatemalensis*).

Phase 1:

In the United States, *Persea americana* Mill. is only present in California, Florida, Hawaii, Puerto Rico, and Virgin Islands (NCRS, 2010).

Phase 2:

The species is listed in:

- NO Geographical Atlas of World Weeds (Holm et al., 1991a).
- NO World's Worst Weeds (Holm et al., 1991b).
- NO World Weeds: Natural Histories and Distribution (Holm et al., 1997).
- NO Weed Science Society of America (WSSA, 2010).
- NO Federal Noxious Weed List (PPQ, 2010).
- NO Economically Important Foreign Weeds (Reed, 1977).
- NO Identification of Disseminules Listed in the Federal Noxious Weed Act (Gunn and Ritchie, 1988).
- NO Global Invasive Species Database (ISSG, 2010).
- YES A Global Compendium of Weeds (Randall, 2007)
- NO Invasive Species of the World (Weber, 2003).
- YES Invasive Plant Atlas of the United States (UGA-CISEH, 2010).
- NO Noxious Weeds in the United States and Canada (Rice, 2010).
- NO State Noxious Weeds (NCRS, 2010).

Other: Scientific literature, Internet sources, etc. (Keywords : *Persea americana* and weeds, avocado and weeds)

- NO AGRICOLA (NAL, 2010), CAB (CABI, 2010), AGRIS (FAO, 2010).
 - NO Florida's Invasive Species List, Florida Exotic Pest Plant Council (FLEPPC, 2009). Pacific Island Ecosystems at Risk (Forest Service, 2010)
 - NO Noxious Weed List for Australian States and Territories (Australian Weeds Committee, 2011).
-

Phase 3:

Avocado is widely prevalent in California, Florida, and Hawaii. There is no evidence in the worldwide literature of invasive behavior. Furthermore, the answer to most of the above questions is negative, except the report of weed potential by Randall (2007) and the Forest Service (2010) reporting avocado as an invasive species in natural areas of some Pacific Island Ecosystems [e.g., offshore Chilean islands; Galapagos (Ecuador); Austral, Gambier, Marquesas, and Society Islands, the Tuamotu Archipelago (French Polynesia); Hawaii (United States); and Pitcairn Islands]. It is considered a weed in the British Islands, French Guiana, Guiana, Surinam, and Puerto Rico. In this case, we need to provide additional comments on our findings (PPQ, 2000).

Conclusion: We proceeded with the pest risk assessment for the following reasons: 1) Cropped avocados are economically important (Wiersema and Leon, 1999); 2) avocados are traditionally grown in southern U.S. production areas; and 3) avocados, are currently permitted entry into the United States from Chile, Mexico, and Peru in large volumes (APHIS, 2010).

2.3. Current Status, Decision History, and Pest Interceptions

2.3.1. Current status

Avocados are authorized to enter into the United States through U.S. ports-of-entry from 30 countries (see Appendix B). While ‘Hass’ avocados are authorized from Mexico (approved municipalities in the State of Michoacán) and Peru (PPQ, 2011a), over the past few decades, no pest risk assessment has been conducted for the importation of ‘Hass’ avocados into the United States from Colombia. The entry of avocados into the United States is allowed from some countries following different requirements (see Appendix C).

2.3.2. Decision history

From 1924 to 1994, the importation of avocados into the United States was denied from the following countries: Australia, Brazil, Central America, Ceylon, Colombia, Costa Rica, Curacao, Ecuador, Fiji islands, French Polynesia, Ghana, Guatemala, Indonesia, Ivory Coast, Japan, Kenya, Liberia, New Hebrides islands, Samoan Islands, Sierra Leone, South Africa, Spain, Trinidad and Tobago, Venezuela, and West Indies. The principal risks identified in decision sheets were 1) *Anastrepha fraterculus*; 2) *Anastrepha* spp.; 3) *Bactrocera psidii* and *B. tryoni*; 4) *Dacus tryoni*; 5) *Dacus* spp.; 6) *Ceratitis capitata*, *C. rosa*, and *C. cosyra*; 7) *Cryptophlebia leucotreta*; 8) *Physalospora perseae*; 9) *Rhizoglyphus*; 10) *Stenomoma catenifer*; and 11) *Heilipus* spp. (CPHST, 2008). For further details, see Appendix D

2.3.3. Pest interceptions

From 1984 to 2011, many different pests were intercepted on avocado at U.S. ports-of-entry (see Appendix E) (PestID, 2011). Most of the intercepted pests belonged to insects (Curculionidae, Diaspididae, Lepidoptera, and Psillidae families); the most intercepted pathogen was *Sphaceloma perseae* (PestID, 2011).

2.4. Pest Categorization—Identification of Pests of Avocado in Colombia

2.4.1. Pests associated with Hass avocado and present in Colombia

Below we present information on pests associated with avocado (in any country) that occur in Colombia (Table 3). The data includes (1) presence or absence of these pests in the continental United States and pertinent citations for their distribution, (2) pertinent citations supporting the association of the pest with avocado, (3) the association of the pest with plant parts and pertinent citations supporting that association, (4) the quarantine status of the pest in the continental United States, and (5) whether the pest is likely to be associated with the commodity at harvest and thus to follow the pathway into the United States on ‘Hass’ avocados. Shaded rows indicate quarantine pests likely to follow the commodity pathway and selected for further analysis.

Table 3. Pests reported on avocado in any country that are also present in Colombia.

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
ARTHROPODS					
ARACHNIDA					
Acari: Eriophyidae					
<i>Eriophyes</i> sp.	CO (Bernal and Diaz, 2006; Posada, 1989)	Bernal and Diaz, 2005; Posada, 1989	L (Bernal and Diaz, 2006; Posada, 1989)	Yes	No
Acari: Tenuipalpidae					
<i>Brevipalpus phoenicis</i> (Geijkes)	CO (Posada, 1989); US (CABI, 2010)	Peña, 2003	N/A	No	N/A
Acari: Tetranychidae					
<i>Allonychus braziliensis</i> McGregor	CO (Posada, 1989)	Bolland et al., 1998; Guerrero and Bellotti, 1980; Migeon and Dorkeld, 2010	L (Guerrero and Bellotti, 1980; Jeppson et al., 1975; Posada, 1989)	Yes	No
<i>Eotetranychus tremae</i> De León	CO (Bolland et al., 1998; Fazzio et al., 2005; Urueta, 1975a) US (Bolland et al., 1998)	Bolland et al., 1998	N/A	No	N/A
<i>Mononychellus planki</i> McGregor	CO (Bolland et al., 1998; Fazzio et al., 2005; Jeppson et al., 1975; Posada, 1989; Urueta, 1975a; Zuluaga, 1980); US (Bolland et al., 1998; Fazzio et al., 2005)	Bernal and Diaz., 2006; Posada, 1989	N/A	No	N/A
<i>Oligonychus coffeae</i> (Nietner) Pritchard and Baker	CO (Bolland et al., 1998; CABI, 2010; Hill, 1983; Posada 1989); US (Bolland et al., 1998; CABI, 2010; Hill, 1983; Jeppson et al., 1975)	Bolland et al., 1998; Migeon and Dorkeld, 2010; Peña et al., 2002; Waite and Martinez, 2002	N/A	No	N/A
<i>Oligonychus mangiferus</i> (Rahman and Sapra) Pritchard and Baker	CO (Posada, 1989); US (HI) (Jeppson et al., 1975)	Bolland et al., 1998; CABI, 2010; Migeon and Dorkeld, 2010	L (Hill, 1983; Jeppson et al., 1975)	Yes	No

¹ We only considered the geographic distribution in the continental United States and Colombia; Colombia = CO; United States = US; States were listed only if the distribution was limited: AL = Alabama, CA = California, DC = District of Columbia, FL = Florida, HI = Hawaii, and TX = Texas.

² Plant parts: Branch = Br; Flower = Fl; Fruit =F; Leaf = L; Peduncle = Pe; Root =R; Seed = Sd; Shoot = Sh; Stem = S.

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Oligonychus mcgregori</i> Baker and Pritchard	CO (Bolland et al., 1998; Posada, 1989; Urueta, 1975a)	Bolland et al., 1998; Migeon and Dorkeld, 2010	L (Posada, 1989)	Yes	No
<i>Oligonychus peruvianus</i> (McGregor) Pritchard and Baker	CO (Posada, 1989; Urueta, 1975a); US (Bolland et al., 1998)	Bolland et al., 1998; CABI, 2010; Migeon and Dorkeld, 2010; Jeppson et al., 1975	N/A	No	N/A
<i>Oligonychus punicae</i> (Hirst) Pritchard and Baker	CO (Bolland et al., 1998; Rios et al., 2005; Urueta, 1975a); US (Ebeling, 1959; Migeon and Dorkeld, 2010; Peña et al., 2002)	Bolland et al., 1998; Peña et al., 2002; Rios et al., 2005; Urueta, 1975a	N/A	No	N/A
<i>Oligonychus yothersi</i> (McGregor) Pritchard and Baker Syn: <i>Paratetranychus yorthesi</i> McGregor	CO (Bolland et al., 1998; Gallego and Vélez, 1992; Jeppson et al., 1975; Posada, 1989; Reyes et al., 2010); US (Bolland et al., 1998; Ebeling, 1959; Jeppson et al., 1975; Peña et al., 2002; Peña, 2003)	Bolland et al., 1998; CABI, 2010; Jeppson et al., 1975; Peña, 2003; Posada, 1989; Waite and Martinez, 2002	N/A	No	N/A
<i>Panonychus citri</i> (McGregor) Ehara	CO (Bolland et al., 1998; CABI, 2010; Posada, 1989); US (Bolland et al., 1998; CABI, 2010; Hill, 1983; Jeppson et al., 1975; Peña et al., 2002)	Bolland et al., 1998; Migeon and Dorkeld, 2010	N/A	No	N/A
<i>Tetranychus gloveri</i> Banks	CO (Bolland et al., 1998; Urueta, 1975a); US (Bolland et al., 1998)	Bolland et al., 1998; Migeon and Dorkeld, 2010	N/A	No	N/A
<i>Tetranychus mexicanus</i> (McGregor) Pritchard and Baker	CO (Bolland et al., 1998; Posada 1989; Urueta, 1975a); US (Bolland et al., 1998; Jeppson et al., 1975; Urueta, 1975a)	Bolland et al., 1998; Migeon and Dorkeld, 2010	N/A	No	N/A

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Tetranychus urticae</i> Koch Syn.: <i>T. bimaculatus</i> Harvey, <i>T. cinnabarinus</i> Biosduval, <i>T. telarius</i> (Linne) (Biosduval) Boudreaux	CO (Bernal and Diaz., 2006; Bolland et al., 1998; CABI, 2010; Gallego and Vélez, 1992; Posada, 1989; Saldarriaga, 1977; Urueta, 1975a; Zuluaga, 1980); US (Bolland et al., 1998; CABI, 2010; Hill, 1983)	Bernal and Diaz, 2006; Bolland et al., 1998; Posada, 1989; Saldarriaga, 1977; Zuluaga, 1980; Urueta, 1975a	N/A	No	N/A
Tarsonemidae					
<i>Polyphagotarsonemus latus</i> Banks	CO (Posada 1989); US (CABI, 2010; Hill, 1983)	CABI, 2010; Hill, 1983; Waite and Martinez, 2002	N/A	No	N/A
Tydeidae					
<i>Lorryia formosa</i> Cooreman	CO (Bernal and Diaz, 2006; Posada, 1989; Zuluaga, 1980); US (FL) (CABI, 2010)	Bernal and Diaz, 2006; Jeppson et al., 1975; PestID, 2011; Posada, 1989; Zuluaga, 1980	L (Posada, 1989; Jeppson, 1989), F (Jeppson, 1989)	[Yes] ³	Yes ⁴
INSECTA					
Coleoptera: Anthribidae					
<i>Araecerus fasciculatus</i> De Geer	CO (CABI, 2010; Peña and Bennett, 1995; Posada, 1989); US (CABI, 2010; Ebeling, 1959; Hill, 1983)	CABI, 2010; Ebeling, 1959	N/A	No	N/A
Coleoptera: Bostrichidae					
<i>Amphicerus cornutus</i> Pallas	CO (Posada, 1989); US (Ebeling, 1959)	Ebeling, 1959	N/A	No	N/A
<i>Bostrychopsis uncinata</i> Germar	CO (Posada, 1989)	Figueroa, 1977	Br (Figueroa, 1977)	Yes	No
<i>Micrapate</i> sp. <i>cerca exigua</i> (Lesne)	CO (Posada, 1989)	Posada, 1989, PestID, 2011	Br (Posada, 1989)	Yes	No
<i>Xylopsocus capucinus</i> Fabricius	CO (Gallego and Velez, 1992); US (Haac, 2006)	Blinda and Joly, 1991; Woodruff et al., 2000	N/A	No	N/A

³ Brackets “[]” indicate that this is a quarantine significant species with limited distribution in the United States.

⁴ *Lorryia formosa* prefers avocado leaves (Posada, 1989). We inferred the damage from citrus fruits, where the pest attacks fruit stems and young fruits, eggs are laid in the peduncles and adults produce a brown damage to tissues that enlarges as they grows (Jeppson, 1989). Thus, damage is readily visually detected and fruits discarded during culling (See Appendix A). Based on this information, this pest is highly unlikely to follow the pathway and was not considered for further mitigation.

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
Coleoptera: Cerambycidae					
<i>Lagocheirus araneiformis</i> (Linnaeus)	CO (CABI, 2010; Figueroa, 1977; Martinez, 2000; Posada, 1989); US (CABI, 2010)	CABI, 2010	N/A	No	N/A
<i>Oncideres digna</i> Bates	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989; Quintero, 2006)	Figueroa, 1977; Posada, 1989	Br, S (Figueroa, 1977; Posada, 1989)	Yes	No
<i>Trachyderes succinctus succinctus</i> Linnaeus Syn: <i>T. interruptus</i> Dupont, <i>T. succinctus</i> (Linné)	CO (Figueroa, 1977; Peña and Bennett, 1995; Martinez, 2000; Posada, 1989)	Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	Br, S (Figueroa, 1977; Posada, 1989; Morales, 1994)	Yes	No
Coleoptera: Chrysomelidae					
<i>Colaspis</i> sp.	CO (Posada, 1989)	Posada, 1989	L (Posada, 1989)	Yes	No
<i>Diabrotica balteata</i> LeConte	CO (CABI, 2010; Figueroa, 1977; Gallego and Vélez, 1992); US (CABI, 2010; Capinera, 1999; Ebeling, 1959)	Ebeling, 1959	N/A	No	N/A
Coleoptera: Cucujidae					
<i>Ahasverus advena</i> (Waltl)	CO (Figueroa, 1977; Posada, 1989); US (CABI, 2010; Ebeling, 1959)	Ebeling, 1959	N/A	No	N/A
Coleoptera: Curculionidae					
<i>Compsus</i> sp.	CO (Posada, 1989)	Posada, 1989	L, R (Posada, 1989)	Yes	No
<i>Copturomimus perseae</i> Hustache	CO (Bernal and Diaz, 2006; Ebeling, 1959; Peña et al., 2002; Posada, 1989)	Ebeling, 1959; Peña et al., 2002; Posada, 1989; Waite and Martínez, 2002	Br, S (Bernal and Diaz, 2006; Peña et al., 2002; Posada, 1989)	Yes	No
<i>Heilipus elegans</i> Guérin-Méneville	CO (Rubio et al., 2009)	Castañeda-Vildózola et al., 2007; Rubio et al., 2009	F (González-Herrera, 2003), S (Castañeda-Vildózola et al., 2007; Rubio et al., 2009)	Yes	No ⁵

⁵ *Heilipus elegans* mainly attacks stems (Barber, 1912; Castañeda-Vildózola et al., 2007; Rubio et al., 2009). Fruit is not a preferred feeding site for this insect: damage is rare and limited mostly to the rinds. The life cycle is completed in soil or

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Heilipus lauri</i> Boheman	CO (CABI, 2010; Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989); US (CA) (Ebeling, 1959)	CABI, 2010; Ebeling, 1959; Posada, 1989; Rios et al., 2005; Saldarriaga, 1977; Waite and Martinez, 2002	F, Sd (Peña et al., 2002; Posada, 1989; Waite and Martinez, 2002)	[Yes] ³	Yes
<i>Heilipus</i> sp. near <i>pittieri</i> Barber	CO (Posada, 1989; Rubio et al., 2009; Urueta, 1976)	Posada, 1989	F (Posada, 1989)	Yes ⁶	Yes
<i>Heilipus trifasciatus</i> (Fabricius)	CO (Cardenas and Posada, 2001; Gallego and Vélez, 1992)	Gallego and Vélez, 1992	F (Cardenas and Posada, 2001; Hoyos and Giraldo, 1984)	Yes	Yes
Coleoptera: Scarabaeidae					
<i>Anomala undulata</i> Melsheimer	CO (Bernal and Diaz, 2006); US (Buss, 2006; Ebeling, 1959)	Ebeling, 1959	N/A	No	N/A
<i>Astaena</i> sp.	CO (Posada, 1989)	Posada, 1989	Fl, L (Posada, 1989); R (Peña and Lucero, 2003)	Yes	No
<i>Gymnetosoma pantherina</i> Burmeister Syn. <i>Gymnetis pantherina</i> Blanchard ⁷	CO (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)	Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989; Saldarriaga, 1977	F (Posada, 1989)	Yes	No ⁸
<i>Macraspis lucida</i> Olivier	CO (Figueroa, 1977; Posada, 1989; Serna, 2004)	Figueroa, 1977	Fl (Figueroa, 1977; Posada, 1989); R (Serna, 2004)	Yes	No

stems (González-Herrera, 2011). Based on this information, *H. elegans* is highly unlikely to follow the pathway and is not further analyzed in this document.

⁶ We found no other information about *Heilipus* sp. near *pittieri* confirming it to be a distinct species. Therefore, we did not further analyze it, particularly because we assessed the risk for two other *Heilipus* species. Any mitigation measures against *H. lauri* and *H. trifasciatus* would likely address *H. sp.* near *pittieri*. If more evidence related to *Heilipus* sp. near *pittieri* becomes available or it is intercepted and identified in cargo from Colombia, its status could change.

⁷ Authority Blanchard is listed with the cited sources of Figueroa (1977), Gallego and Velez (1992), and Posada (1989). However, authority Burmeister is listed in other literature sources that are not cited in this document.

⁸ *Gymnetosoma pantherina* adult stages are reported damaging fruits (Posada, 1989). However, adults are large size (from 1 to 2 cm) and have showy colors that could be easily visually detected (Orozco and Pardo-Locarno, 2004). We listed this insect but note that it is highly unlikely to act as a pest because adults have no jaws (Orozco, 2011) and larvae are detritivorous and always found underground (Orozco, 2011). Thus, adults are highly unlikely to be present on the commodity at harvest.

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Macroductylus tenuilineatus</i> Guérin-Méneville Syn: <i>M. flavolineatus</i> Guérin-Méneville	CO (Evans and Smith, 2007; Figueroa, 1977; Posada, 1989)	Figueroa, 1977; Madrigal, 2002	Fl (Figueroa, 1977; Madrigal, 2002); L (Posada, 1989)	Yes	No
Coleoptera: Scolytidae					
<i>Amphicranus</i> sp.	CO (Posada, 1989)	Posada, 1989	Br, S (Posada, 1989)	Yes	No
<i>Hypothenemus eruditus</i> Westwood	CO (Figueroa, 1977; Posada, 1989); US (Atkinson and Peck, 1994; Atkinson, 2011; Ferro, 2006)	Ebeling, 1959	N/A	No	N/A
<i>Pagiocerus frontalis</i> (Fabricius)	CO (Posada, 1989); US (Atkinson and Peck, 1994)	Ayquipa-Aycho et al., 2009; PestID, 2011	N/A	No	N/A
<i>Xyleborus affinis</i> Eichhoff	CO, (Figueroa, 1977; Posada, 1989); US (Atkinson and Peck, 1994; CABI, 2010; Peterson, 1990)	Figueroa, 1977; Posada, 1989	N/A	No	N/A
<i>Xyleborus capucinus</i> Eichhoff	CO (Figueroa, 1977; Posada, 1989)	Posada, 1989	Br, S (Posada, 1989)	Yes	No
<i>Xyleborus ferrugineus</i> Fabricius	CO (Figueroa, 1977; Posada, 1989; Velez, 1997); US (CABI, 2010)	CABI, 2010; Rondon and Guevara, 1984	N/A	No	N/A
<i>Xyleborus morigerus</i> Blandford Syn: <i>Xylosandrus morigerus</i> Blandford	CO (Gallego and Vélez, 1992; Posada, 1989)	CABI, 2010; Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	Br, S (Posada, 1989)	Yes	No
<i>Xyleborus</i> sp. cerc. <i>Ia ferox</i> Bland.	CO (Gallego and Vélez, 1992)	Gallego and Vélez, 1992	S (Gallego and Vélez, 1992)	Yes	No
<i>Xyleborus volvulus</i> Fabricius	CO (CABI, 2010); US (Atkinson, 2011) CABI, 2010)	CABI, 2010	N/A	No	N/A
Diptera: Cecidomyiidae					
<i>Brugmaniella perseae</i> Gagné	CO (Gagne et al., 1994)	Gagne et al., 1994	F (Gagne et al., 1994)	Yes	No ⁹

⁹Fruits oviposited and infested by *Brugmaniella perseae* can be recognized in the field by its shape (malformation) when it is only about 1 cm long. The adult emerges from the end of the pupal body. Fruits are aborted and fall to the soil when are less than 2 cm in length (Gagne et al., 2004). Aborted fruits are not marketable. Based on this evidence, this pest is highly unlikely to follow the pathway.

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
Diptera: Lonchaeidae					
<i>Neosilba batesi</i> (Curran)	CO (Gallego and Vélez, 1992); US (Ahlmarm and Steck, 1997; Mead, 1994; Thomas, 2000)	Ahlmark and Steck, 1997; Mead, 1994	N/A	No	N/A
Diptera: Muscidae					
<i>Atherigona orientalis</i> Schiner	CO (CABI, 2010; Figueroa, 1977; Posada, 1989); US (CABI, 2010)	Ebeling, 1959	N/A	No	N/A
Hemiptera: Aetalionidae					
<i>Aethalion reticulatum</i> (Linneaus)	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989)	Ebeling, 1959; Posada, 1989	L (ICA, 1982; Posada, 1989); S (Figueroa, 1977)	Yes	No
Hemiptera: Aleyrodidae					
<i>Aleurocanthus woglumi</i> Ashby	CO (CABI, 2010; Posada, 1989); US (AZ, CA, FL, MS, TX) (CABI, 2010; Ebeling, 1959; Evans, 2008; Nguyen, 1998)	Ebeling, 1959; PestID, 2011	L, S (CABI, 2010; Posada, 1989)	[Yes] ^{3,10}	No
<i>Aleurodicus cocois</i> (Curtis)	CO (CABI, 2010; Gallego and Vélez, 1992; Posada 1989); US (FL) (Miller et al., 2000)	CABI, 2010; Evans, 2007; Miller et al., 2000	L (CABI, 2010; Posada 1989)	[Yes] ³	No
<i>Aleurodicus coccolobae</i> Quaintance and Baker	CO (Evans, 2007); US (FL) (Hodges and Evans, 2005)	Miller et al., 2000	L (Miller et al., 2000)	[Yes] ³	No
<i>Aleurodicus dispersus</i> (Russell)	CO (CABI, 2010; Posada, 1989); US (Cherry, 1980; EPPO, 2006)	PestID, 2011; Evans, 2007; CABI, 2010	N/A	No ¹¹	N/A
<i>Aleurodicus pulvinatus</i> (Maskell) Syn: <i>A. iridescens</i> Cockerell	CO (CABI, 2010; Posada, 1989; Saldarriaga et al., 1977)	CABI, 2010; Evans, 2007; Miller et al., 2000; Posada, 1989; Saldarriaga et al., 1977	L (CABI, 2010; Posada, 1989)	Yes	No

¹⁰ *Aleurocanthus woglumi* Ashby remain reportable pending evaluation for possible official control (PestID, 2011; NIS, 2008).

¹¹ *Aleurodicus dispersus* is only actionable on propagative material (Pest ID, 2011).

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Aleuroglandulus subtilis</i> Bondar Syn.: <i>A. malangae</i> Russell	CO (Gallego and Vélez, 1992); US (Miller et al., 2000)	Evans, 2007; Miller et al., 2000	N/A	No	N/A
<i>Aleuroplatus cococolus</i> Quaintance and Baker	CO (Evans, 2007; Posada, 1989)	PestID, 2011; Evans, 2007	L (PestID, 2011; Posada, 1989)	Yes	No
<i>Aleurothrixus floccosus</i> (Maskell)	CO (CABI, 2010; Evans, 2007; Figueroa, 1977; Posada, 1989); US (CABI, 2010)	Evans, 2007; Miller et al., 2000	N/A	No	N/A
<i>Aleurotrachelus</i> sp.	CO (Posada, 1989)	Posada, 1989	L (Posada, 1989)	Yes	No
<i>Bemisia argentifolii</i> Bellows, Perring, Gill & Hendrick Syn.: <i>B. tabaci</i> (Gennadius) (B Biotype)	CO (CABI, 2010); US (CABI, 2010; Mau and Lee, 2007)	Mau and Lee 2007	N/A	No	N/A
<i>Lecanoideus mirabilis</i> (Cockerell) Syn.: <i>Aleurodicus mirabilis</i> (Cockerell)	CO (Evans, 2007; Figueroa, 1977)	Figueroa, 1977	L (Figueroa, 1977)	Yes	No
<i>Paraleyrodes</i> sp.	CO (Evans, 2007)	Evans, 2007	L (Figueroa, 1977)	Yes	No
<i>Tetraleurodes mori</i> (Quaintance)	CO (Saldarriaga and Posada, 1993); US (Evans, 2008)	Evans, 2007	N/A	No	N/A
<i>Trialeurodes vaporariorum</i> Westwood	CO (CABI, 2010; Figueroa, 1977; Miller et al., 2000; Posada, 1989); US (CABI, 2010; Cole and Jackman, 1997; Miller et al., 2000)	Ebeling, 1959; Lynce 2007	N/A	No	N/A
Hemiptera: Aphididae					
<i>Aphis fabae</i> Scopol Syn.: <i>A. nerii</i> Boyer de Fonscolombe, <i>A. rumicis</i> Linnaeus	CO (Figueroa, 1977; Posada, 1989); US (CABI, 2010)	Ebeling, 1959; Gallego and Vélez, 1992	N/A	No	N/A
<i>Aphis gossypii</i> Glover	CO (CABI, 2010; Figueroa, 1977; Posada, 1989); US (CABI, 2010)	CABI, 2010; Ebeling, 1959	N/A	No	N/A
<i>Aphis spiraecola</i> Patch	CO (Bernal and Diaz, 2006; CABI, 2010, 2006; Posada, 1989); US (CABI, 2010)	Figueroa, 1977; Saldarriaga et al., 1977	N/A	No	N/A

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Myzus ornatus</i> Laing	CO (Figueroa, 1977; Posada, 1989); US (Miller and Stoetzel, 1997)	Figueroa, 1977; Posada, 1989; Saldarriaga et al., 1977	N/A	No	N/A
<i>Myzus persicae</i> (Sulzer)	CO (CABI, 2010; Figueroa, 1977; Posada, 1989; Saldarriaga et al., 1977); US (CABI, 2010)	CABI, 2010; Bernal and Diaz, 2006; Figueroa, 1977; Saldarriaga et al., 1977	N/A	No	N/A
<i>Toxoptera aurantii</i> Boyer de Foscolombe	CO (CABI, 2010, 2006; Posada, 1989); US (CABI, 2010; Ebeling, 1959)	Ebeling, 1959	N/A	No	N/A
Hemiptera: Asterolecaniidae					
<i>Asterolecanium pustulans</i> (Cockerell)	CO (CABI, 2007; Posada, 1989); US (CABI, 2007)	Ebeling, 1959	N/A	No	N/A
Hemiptera: Cicadellidae					
<i>Empoasca stevensi</i> Young	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989)	Mau and Martin, 2007	L (Figueroa, 1977; Posada, 1989); S (Mau and Martin, 2007)	Yes	No
<i>Oncometopia obtusa</i> (Fabricius)	CO (Freytag and Sharkey, 2002; Posada, 1989; Saldarriaga et al., 1977)	Saldarriaga et al., 1977	L (Posada, 1989)	Yes	No
<i>Oncometopia undata</i> (Fabricius)	CO (Posada, 1989; Figueroa, 1977); US (Sanderson, 1906)	Posada, 1989; Figueroa, 1977	N/A	No	N/A
<i>Tylozygus fasciatus</i> Walker	CO (Freytag and Sharkey, 2002); US (Maes and Godoy, 1993)	Ebeling, 1959	N/A	No	N/A
Hemiptera: Coccidae					
<i>Bombacoccus aguacatae</i> Kondo	CO (Kondo, 2010)	Kondo, 2010	S (Kondo, 2010)	Yes	No
<i>Ceroplastes cirripediformis</i> Comstock	CO (Ben-Dov et al., 2010; Figueroa, 1977; Hamon and Williams, 1984; Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2010; Ebeling, 1959; Hamon and Williams, 1984)	Ebeling, 1959; Waite and Martinez, 2002	N/A	No	N/A

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Ceroplastes floridensis</i> Comstock	CO (Ben-Dov et al., 2010; CABI, 2010; Figueroa, 1977; Kondo, 2001); US (Ben-Dov et al., 2010; CABI, 2010; Ebeling, 1959; Hamon and Williams, 1984)	Ben-Dov et al., 2010; Ebeling, 1959; Peña, 2003	N/A	No	N/A
<i>Ceroplastes rubens</i> Maskell	CO (Kondo, 2008); US (FL) (Ben-Dov et al., 2010; CABI, 2010)	Ben-Dov et al., 2010; Ebeling, 1959; PestID, 2011	F (PestID, 2011); L (CABI, 2010); S (CABI, 2010; Peña et al., 2002)	[Yes] ³	Yes ¹²
<i>Coccus hesperidum</i> Linnaeus Syn: <i>C. hesperidum</i> subsp. <i>hesperidum</i>	CO (Ben-Dov et al., 2010; CABI, 2010; Figueroa, 1977; Gallego and Vélez, 1992); US (Ben-Dov et al., 2010; CABI, 2010; Ebeling, 1959; Hamon and Williams, 1984)	Ben-Dov et al., 2010; CABI, 2010; Ebeling, 1959; Peña et al., 2002; Waite and Martinez, 2002	N/A	No	N/A
<i>Coccus longulus</i> (Douglas)	CO (Ben-Dov et al., 2010; Kondo, 2001); US (Ben-Dov et al., 2010)	Ben-Dov et al., 2010	N/A	No	N/A
<i>Coccus nigra</i> Guenée	CO (Bernal and Diaz, 2006; Posada, 1989; Saldarriaga, 1977)	Bernal and Diaz, 2006; Posada, 1989; Saldarriaga, 1977	Br, L (Bernal and Diaz, 2006)	Yes	No
<i>Coccus viridis</i> (Green)	CO (Ben-Dov et al., 2010; CABI, 2010; Hamon and Williams, 1984; Kondo, 2001; Posada, 1989); US (FL) (Ben-Dov et al., 2010)	Ben-Dov et al., 2010; Bernal and Diaz, 2006; Posada, 1989; Saldarriaga, 1977	N/A	No	N/A

¹² *Ceroplastes rubens* is known to be distributed in the Valle del Cauca Department in Colombia (Kondo, 2008; Kondo 2011a). However, this pest is highly unlikely to follow the pathway due to standard post-harvest processing on ‘Hass’ avocado fruits (see Appendix A). Specifically these practices are postharvest step 4, brushing and washing of fruits to remove dust, large particles, and external pests, and step 5, culling of fruits with external pests.

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Eucalymnatus tessellatus</i> (Signoret)	CO (Ben-Dov et al., 2010; Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2010; Ebeling, 1959; Hamon and Williams, 1984; Peña, 2003)	Ebeling, 1959; Peña, 2003	N/A	No	N/A
<i>Kilifia acuminata</i> (Signoret) Syn: <i>Coccus acuminata</i> (Signoret)	CO (Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2010)	Ben-Dov et al., 2010; Peña, 2003; PestID, 2011	N/A	No	N/A
<i>Milviscutulus mangiferae</i> Green Syn: <i>Coccus mangiferae</i> (Green)	CO (Ben-Dov et al., 2010; Posada, 1989); US (Ben-Dov et al., 2010)	Ben-Dov et al., 2010; French, 1996	N/A	No	N/A
<i>Parasaissetia nigra</i> Nietner	CO (Ben-Dov et al., 2010; CABI and EPPO, 1997; Figueroa, 1977; Kondo, 2001; Posada, 1989; Saldarriaga, 1977); US (Ben-Dov et al., 2010; CABI and EPPO, 1997)	Ben-Dov et al., 2010; Bernal and Diaz, 2006; CABI and EPPO, 1997; Gallego and Vélez, 1999; Posada, 1989; Saldarriaga, 1977	N/A	No	N/A
<i>Protospulvinaria longivalvata</i> Green	CO (Gallego and Vélez, 1992; Kondo, 2001; Posada, 1989; Saldarriaga 1977)	Ebeling, 1959; Saldarriaga 1977	L, S (Rung et al., 2007) ¹³	Yes	No
<i>Protospulvinaria pyriformis</i> (Cockerell) Syn: <i>Pulvinaria pyriformis</i> Cockerell	CO (Ben-Dov et al., 2007; Figueroa, 1977; Kondo, 2001; Posada, 1989); US (Ebeling, 1959)	Ben-Dov et al., 2010; Figueroa, 1977; Peña, 2003; Posada, 1989	N/A	No	N/A
<i>Pulvinaria elongata</i> Newstead Syn.: <i>Coccus elongatus</i> Signoret	CO (Ben-Dov et al., 2010; Kondo, 2001; Madrigal, 2002); US (Ben-Dov et al., 2010)	ecoport, 2008	N/A	No	N/A
<i>Pulvinaria psidii</i> Maskell	CO (Gallego and Vélez, 1992; Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2010)	Ebeling, 1959; Peña, 2003	N/A	No	N/A

¹³ *Protospulvinaria longivalvata* has been intercepted several times on *Citrus sinensis* and *Mangifera indica* fruits from baggage, but only once on avocado leaves (PestID, 2011). Therefore, we have no evidence that it occurs on avocado fruit.

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Saissetia coffeae</i> Walker Syn.: <i>S. hemisphaerica</i> (Targioni)	CO (Bernal and Diaz, 2006; Ben-Dov et al., 2007; Figueroa, 1977; Posada, 1989); US (Ben-Dov et al., 2007; CABI, 2010; Hamon and Williams, 1984)	Bernal and Diaz, 2006; CABI, 2010; Ebeling, 1959, Figueroa, 1977; Posada, 1989	N/A	No	N/A
<i>Saissetia miranda</i> (Cockerell and Parrot)	CO (Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2007; Hamon and Williams, 1984)	Ben-Dov et al., 2007	N/A	No	N/A
<i>Saissetia neglecta</i> DeLotto	CO (Ben-Dov et al., 2007; Kondo, 2001); US (Ben-Dov et al., 2007)	Peña, 2003	N/A	No	N/A
<i>Saissetia oleae</i> (Olivier) Syn.: <i>S. oleae oleae</i> Olivier	CO (Bernal and Diaz, 2006; CABI, 2010; Kondo, 2001; Posada, 1989; Saldarriaga 1977); US (CABI, 2010; Hamon and Williams, 1984)	CABI, 2010; Ebeling, 1959; Peña, 2003; Posada, 1989; Saldarriaga 1977; Waite and Martinez, 2002	N/A	No	N/A
<i>Vinsonia stellifera</i> (Westwood)	CO (Ben-Dov et al., 2007; Kondo, 2001; Posada, 1989); US (AL, FL) (Ben-Dov et al., 2007; Hamon and Williams, 1984)	Ben-Dov et al., 2007	F, L, S (Peña et al., 2002); L (Figueroa, 1977; Hill, 1983)	[Yes] ³	Yes ¹⁴
Hemiptera: Coreidae					
<i>Leptoglossus zonatus</i> Dallas	CO (Gallego and Vélez, 1992; Posada, 1989); US (Schaefer and Panizzi, 2000)	Ebeling, 1959; Mitchell, 2000	N/A	No	N/A
Hemiptera: Diaspididae					
<i>Abgrallaspis cyanophylli</i> Signoret Syn.: <i>Hemiberlesia cyanophylli</i> Signoret	CO (Ben-Dov et al., 2010; Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2007; Ebeling, 1959)	Ben-Dov et al., 2010; Ebeling, 1959; Martin and Mau, 2007; PestID, 2011; Posada, 1989	N/A	No	N/A

¹⁴ This pest is highly unlikely to follow the pathway due to standard harvest and post-harvest processing on ‘Hass’ avocado fruits (see Appendix A). Specifically these practices are postharvest step 4, brushing and washing of fruits to remove dust, large particles, and external pests, and step 5, culling of fruits with external pests. We did not consider this pest for further mitigation.

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Acutaspis perseae</i> (Comstock) Syn.: <i>Chrysomphalus perseae</i> Comstock	CO (Mosquera, 1989; Watson, 2005); US (Ben-Dov et al., 2007; Miller et al., 2005)	Peña, 2003; Watson, 2005	N/A	No	N/A
<i>Acutaspis scutiformis</i> Cockerell	CO (Ben-Dov et al., 2010; Bernal and Diaz, 2005; Figueroa, 1977; Kondo, 2001; Mosquera, 1989; Posada, 1989; Rios et al., 2005; Watson, 2005); US (TX) (Ben-Dov et al., 2007; Miller et al., 2005; Watson, 2005)	Ben-Dov et al., 2010; Bernal and Diaz, 2006; Figueroa, 1977; Posada, 1989; Figueroa, 1977; Saldarriaga, 1977; Watson, 2005	L (Figueroa, 1977; Posada, 1989)	[Yes] ³	No
<i>Aonidiella orientalis</i> Newstead	CO (Gallego and Vélez, 1992; Mosquera, 1989; Watson, 2005; PestID, 2011); US (CABI, 2010; Ebeling, 1959; Watson, 2005)	Ebeling, 1959; PestID, 2011; Peña, 2003; Watson, 2005	N/A	No	N/A
<i>Aspidiotus destructor</i> Signoret	CO (Ben-Dov et al., 2007; CABI, 2010; Gallego and Vélez, 1992; Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2007; CABI, 2010; Ebeling, 1959)	Bernal and Diaz, 2005; CABI, 2010; Ebeling, 1959; Posada, 1989; Saldarriaga, 1977	N/A	No	N/A
<i>Aspidiotus nerii</i> Bouché Syn.: <i>A. hederæ</i> Signoret	CO (Ben-Dov et al., 2007; CABI, 2010; Kondo, 2001; Posada, 1989; Watson, 2005); US (Ben-Dov et al., 2007; CABI, 2010; Watson, 2005)	Ben-Dov et al., 2007; Ebeling, 1959; Watson, 2005	N/A	No	N/A

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Aulacaspis tubercularis</i> (Newstead)	CO (CABI, 2010; Figueroa, 1977; Gallego and Vélez, 1992; Mosquera, 1989; Posada, 1989; PestID, 2011; Watson, 2005); US (FL) (Miller et al., 2005)	Ben-Dov et al., 2007; CABI, 2010	F (PestID, 2011; CABI, 2010); L, S (CABI, 2010; Posada, 1989; Watson, 2005)	[Yes] ³	Yes ¹⁵
<i>Chrysomphalus aonidum</i> (Linnaeus) Syn.: <i>C. ficus</i> Ashmed	CO (Ben-Dov et al., 2007; CABI, 2010; Kondo, 2001); US (Ben-Dov et al., 2007; CABI, 2010; Ebeling, 1959)	Ben-Dov et al., 2007; Ebeling, 1959; Peña, 2003; Watson, 2005	N/A	No	N/A
<i>Chrysomphalus dictyospermi</i> Morgan	CO (Ben-Dov et al., 2007; CABI, 2010; Figueroa, 1977; Kondo, 2001; Mosquera, 1989; Posada, 1989); US (Ben-Dov et al., 2007; CABI, 2010; Ebeling, 1959)	Ben-Dov et al., 2007; CABI, 2010; Ebeling, 1959; Alvarez de la Peña, 1981; Peña et al., 2002; Posada, 1989	N/A	No	N/A
<i>Clavaspis herculeana</i> Doane and Hadden	CO (Bernal and Diaz, 2006; Kondo, 2001; Mosquera, 1989); US (Ben-Dov, 2010)	Bernal and Diaz, 2006; Posada, 1989	N/A	No	N/A
<i>Diaspis boisduvalii</i> Signoret	CO (Ben-Dov et al., 2007; Kondo, 2001; Mosquera, 1989; Posada, 1989; Watson, 2005); US (Ben-Dov et al., 2007; Watson, 2005)	Ben-Dov et al., 2007; Ebeling, 1959; Watson, 2005	N/A	No	N/A
<i>Furcaspis biformis</i> (Cockerell)	CO (Kondo, 2001; Posada, 1989); US (Ben-Dov, 2010)	Ebeling, 1959	N/A	No	N/A
<i>Hemiberlesia diffinis</i> (Newstead)	CO (Ben-Dov et al., 2007; Mosquera, 1989); US (Ben-Dov et al., 2007)	Ben-Dov et al., 2007; Peña, 2003	N/A	No	N/A

¹⁵ Although armored scales may enter on commercial fruit for consumption, they are highly unlikely to become established via this pathway. Please see discussion in section 2.4.3 for a detailed explanation.

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Hemiberlesia lataniae</i> (Signoret)	CO (Ben-Dov et al., 2007; Kondo, 2001; PestID, 2011; Posada, 1989; Watson, 2005); US (Ben-Dov et al., 2007; Watson, 2005)	Ben-Dov et al., 2007; CABI, 2010; Ebeling, 1959; Peña, 2003; PestID, 2011; Watson, 2005	N/A	No	N/A
<i>Hemiberlesia palmae</i> Cockerell Syn.: <i>Aspidiotus palmae</i> (Cockerell)	CO (Ben-Dov et al., 2007; Kondo, 2001; Figueroa, 1977; Posada, 1989; Watson, 2005); US (Ben-Dov et al., 2007; Watson, 2005)	Ben-Dov et al., 2007; Ebeling, 1959; Gallego and Vélez, 1992; Posada, 1989; Saldarriaga, 1977; Watson, 2005	N/A	No	N/A
<i>Hemiberlesia rapax</i> (Comstock) Syn.: <i>Aspidiotus camelliae</i> Boisduval	CO (Ben-Dov et al., 2007; Ebeling, 1959; Mosquera, 1989); US (Ben-Dov et al., 2007; Ebeling, 1959; Watson, 2005)	Ben-Dov et al., 2007; Ebeling, 1959	N/A	No	N/A
<i>Howardia biclavis</i> (Comstock)	CO (Ben-Dov et al., 2007; Kondo, 2001; Mosquera, 1989; Watson, 2005) US (Ben-Dov et al., 2007; Watson, 2005)	Ben-Dov et al., 2007	N/A	No	N/A
<i>Ischnaspis longirostris</i> (Signoret)	CO (Ben-Dov et al., 2007; Figueroa, 1977; Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2007; CABI, 2010)	Ben-Dov et al., 2007; Ebeling, 1959	N/A	No	N/A
<i>Lepidosaphes beckii</i> Newman	CO (Ben-Dov et al., 2007; Kondo, 2001; Mosquera, 1989); US (Ben-Dov et al., 2007)	Ebeling, 1959	N/A	No	N/A
<i>Lopholeucaspis cockerelli</i> (Grandpré and Charmoy)	CO (Ben-Dov et al., 2007; Kondo, 2001; Watson, 2005); US (Ben-Dov et al., 2007; Watson, 2005)	Ben-Dov et al., 2007; Watson, 2005	N/A	No	N/A
<i>Melanaspis</i> sp.	CO (Figueroa, 1977; Posada, 1989)	Posada, 1989	L (PestID, 2011; Figueroa, 1977)	Yes	No

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Mycetaspis personata</i> (Comstock) Syn.: <i>Chrysomphalus personatus</i> Fernald	CO (Ben-Dov et al., 2007; Kondo, 2001; Posada, 1989; Watson, 2005); US (FL) (Watson, 2005; Ben-Dov, 2010)	Ebeling, 1959; Watson, 2005	F, Fl, L (Watson, 2005)	[Yes] ³	Yes ¹⁵
<i>Oceanaspidiotus spinosus</i> (Comstock) Syn: <i>Aspidiotus spinosus</i> Comstock	CO (Ben-Dov et al., 2007; Gallego and Vélez, 1992; Mosquera, 1989; Posada, 1989); US (Ben-Dov et al., 2007; Ebeling, 1959)	Ben-Dov et al., 2007; Ebeling, 1959; Peña, 2003; PestID, 2011	N/A	No	N/A
<i>Parlatoria pergandii</i> Comstock	CO (Ben-Dov et al., 2007; Kondo, 2001; Posada, 1989; Watson, 2005); US (Ben-Dov et al., 2007; Watson, 2005)	Peña, 2003	N/A	No	N/A
<i>Parlatoria proteus</i> Curtis	CO (Ben-Dov et al., 2007; Watson, 2005); US (Ben-Dov et al., 2007; Watson, 2005)	Ebeling, 1959; Peña, 2003	N/A	No	N/A
<i>Pinnaspis aspidistrae</i> Signoret	CO (Ben-Dov et al., 2007; Kondo, 2001; Mosquera, 1989; Posada, 1989; Watson, 2005); US (Ben-Dov et al., 2007; Miller et al., 2005; Watson, 2005)	Watson, 2005	N/A	No	N/A
<i>Pinnaspis strachani</i> (Cooley)	CO (Ben-Dov et al., 2007; Kondo, 2001; Posada, 1989; Watson, 2005); US (Ben-Dov et al., 2007; Miller et al., 2005; Watson, 2005)	Ben-Dov et al., 2007; Ebeling, 1959; Watson, 2005	N/A	No	N/A
<i>Pseudaonidia trilobitiformis</i> Green	CO (Ben-Dov et al., 2007; Kondo, 2001; Mosquera, 1989; Posada, 1989; Watson, 2005); US (Ben-Dov et al., 2007; Watson, 2005)	Ben-Dov et al., 2007; Ebeling, 1959; Mosquera, 1989; Posada, 1989; Watson, 2005	N/A	No	N/A

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Pseudischnaspis acephala</i> Ferris	CO (Ben-Dov et al., 2007; Kondo, 2001; Posada, 1989; Watson, 2005)	Kondo, 2001; Gallego and Vélez, 1992; Mosquera, 1989; Posada, 1989	F (Watson, 2005; Miller et al., 1984); L (Ben-Dov et al., 2007; Posada, 1989)	Yes	Yes ¹⁵
<i>Pseudischnaspis bowreyi</i> (Cockerell) Syn.: <i>P. longissima</i> (Cockerell)	CO (Ben-Dov et al., 2007; Kondo, 2001; Watson, 2005); US (Ben-Dov et al., 2007; Watson, 2005)	Watson, 2005	N/A	No	N/A
<i>Pseudoparlatoria parlatorioides</i> Comstock	CO (Ben-Dov et al., 2007; Figueroa, 1977; Posada, 1989); US (Ben-Dov et al., 2007; Watson, 2005)	Bernal and Diaz, 2006; Ebeling, 1959; Figueroa, 1977; Kondo, 2001; Peña, 2003; Posada, 1989	N/A	No	N/A
<i>Selenaspis articulatus</i> (Morgan)	CO (Ben-Dov et al., 2007; CABI, 2010; Kondo, 2001; Posada, 1989); US (Ben-Dov et al., 2007; Ebeling, 1959)	Ben-Dov et al., 2007; Bernal and Diaz, 2005; Ebeling, 1959; Posada, 1989; Saldarriaga, 1977	N/A	No	N/A
<i>Unaspis citri</i> (Comstock)	CO (Ben-Dov et al., 2007; CABI, 2010; CABI and EPPO, 1997; Kondo, 2001; Posada, 1989; Velez, 1997); US (Ben-Dov et al., 2007; CABI, 2010; CABI and EPPO, 1997)	Velez, 1997	N/A	No	N/A
Hemiptera: Margarodidae					
<i>Icerya montserratensis</i> Riley and Howard	CO (Ben-Dov et al., 2007; Figueroa, 1977; Posada, 1989)	Ben-Dov et al., 2007; Ebeling, 1959	L (Posada, 1989)	Yes	No
<i>Icerya purchasi</i> Maskell	CO (CABI, 2010; Posada, 1989); US (CABI, 2010; Hill, 1983)	Ebeling, 1959	N/A	No	N/A
<i>Laurencella colombiana</i> Foldi and Watson	CO (Ben-Dov et al., 2007; Foldi and Watson, 2001; Gil et al., 2007)	Ben-Dov et al., 2007; Foldi and Watson, 2001; Gil et al., 2007	L, S (Ben-Dov et al., 2007; Gil et al., 2007)	Yes	No

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
Hemiptera: Membracidae					
<i>Antianthe expansa</i> (Germar)	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989); US (Ratnasingham and Hebert, 2007)	Figueroa, 1977	N/A	No	N/A
<i>Enchenopa lanceolata</i> (Stoll)	CO (Figueroa, 1977)	Figueroa, 1977	L (Figueroa, 1977)	Yes	No
<i>Membracis mexicana</i> Guer.	CO (Madrigal, 1986; Madrigal, 2002)	Ebeling, 1959	L (Madrigal, 2002) ¹⁶	Yes	No
<i>Metcalfiella monogramma</i> Germar	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989)	PestID, 2011; Ebeling, 1959	Br (Peña et al., 2002); L (PestID, 2011; Posada, 1989)	Yes	No
<i>Metcalfiella</i> sp.	CO (Gallego and Vélez, 1992)	Gallego and Vélez, 1992;	Sh (Gallego and Vélez, 1992)	Yes	No
<i>Umbonia crassicornis</i> (Amyot and Serville)	CO (Gallego and Vélez, 1992; Posada, 1989); US (Mead, 2004)	Teliz, 2000	N/A	No	N/A
Hemiptera: Miridae					
<i>Monalonion velezangeli</i> Carvalho and Costa	CO (Bernal and Diaz, 2006; Cárdenas and Posada, 2001)	Bernal and Diaz, 2006; Cárdenas and Posada, 2001; Gallego and Vélez, 1992	F (Bernal and Diaz, 2006; Cárdenas and Posada, 2001); L (Lynce, 2007)	Yes	No ¹⁷
Hemiptera: Pentatomidae					
<i>Antiteuchus pallescens</i> Stal Syn: <i>Mecistorhinus pallescens</i> Stal.	CO (Bernal and Diaz, 2006; Figueroa, 1977; Posada, 1989)	Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	Br, F, L, and Pe (Bernal and Diaz, 2006)	Yes	No ¹⁸
<i>Antiteuchus piceus</i> Palisot-Beauvois Syn: <i>Mecistorhinus piceus</i> P. de Beauvois	CO (Bernal and Diaz, 2006; Figueroa, 1977; Posada, 1989)	Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	Br, F, L, and Pe (Bernal and Diaz, 2006)	Yes	No ¹⁸
<i>Antiteuchus</i> spp.	CO (Gallego and Vélez, 1992)	Gallego and Vélez, 1992	L (Posada, 1989)	Yes	No

¹⁶ *Membracis mexicana* is listed as an avocado pest (Ebeling, 1959). However, the avocado plant parts attacked by this pest are unknown. The information here was inferred from attacked eucalyptus leaves (Madrigal, 2002).

¹⁷ *Monalonion velezangeli* damage is caused by the nymphs and the adults who feed on buds and surfaces of young fruits (Cárdenas and Posada, 2001). Because of its size [1.5 to 12 mm (0.0590 to 0.4724 in)], biology, and mobility, this pest is highly unlikely to stay on the commodity through standard harvest and postharvest processing.

¹⁸ *Antiteuchus pallescens*, *A. piceus*, *A. tripterus*, and *A. variegatus*: damage is caused by the nymphs and the adults, which feed on buds and peduncles of young fruits that dry up and fall (Bernal and Diaz, 2006). Dropped fruits are not marketable. Because of its size, this pest is highly unlikely to stay on the commodity through standard harvest and postharvest processing.

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Antiteuchus tripterus</i> (Fabricius) Syn: <i>A. tripterus linbativentris</i> Ruckes, <i>Mecistorhinus tripterus</i> Kirkaldy	CO (Bernal and Diaz, 2006; Castaño, 1983; Figueroa, 1977; Posada, 1989)	Madrigal , 2002; PestID, 2011; Posada, 1989	Br, F, L, Pe (Bernal and Diaz, 2006)	Yes	No ¹⁸
<i>Antiteuchus variegatus</i> Dallas Syn: <i>Dinocoris variegatus</i> (Lineé)	CO (Figueroa, 1977)	Figueroa, 1977	L (Figueroa, 1977)	Yes	No
<i>Chlorocoris tau</i> Spinola	CO (Figueroa, 1977)	Figueroa, 1977	Sh (Figueroa, 1977)	Yes	No
<i>Nezara viridula</i> Linnaeus.	CO (CABI, 2010; Gallego and Vélez, 1992; Posada, 1989); US (CABI, 2010)	Ebeling, 1959; Peña et al., 2002	N/A	No	N/A
Hemiptera: Pseudococcidae					
<i>Dysmicoccus brevipes</i> (Cockerell)	CO (Ben-Dov et al., 2007; CABI, 2010; Kondo, 2001; Posada, 1989; Williams and Granara, 1992); US (Ben-Dov et al., 2007; CABI, 2010)	Ben-Dov et al., 2007; Williams and Granara, 1992; Granara, 2009	N/A	No	N/A
<i>Dysmicoccus grassii</i> Leonardi Syn.: <i>D. alazon</i> Williams	CO (Ben-Dov et al., 2007; Kondo, 2001; Williams and Granara, 1992); US (Miller and Miller 2002; Miller et al., 2005)	CABI, 2011; Alvarez de la Peña, 1981	N/A	No	N/A
<i>Ferrisia virgata</i> Cockerell	CO (Ben-Dov et al., 2010; Bernal and Diaz, 2006; CABI, 2010; Posada, 1989; Saldarriaga, 1977; Williams and Granara, 1992); US (Ben-Dov et al., 2010; CABI, 2010)	Ben-Dov et al., 2010; Bernal and Diaz, 2006; Ebeling, 1959; Posada, 1989	N/A	No	N/A

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Maconellicoccus hirsutus</i> (Green)	CO ¹⁹ (ICA, 2010; Kondo et al., 2008); US (CA, FL, GA, LA, TX) (CABI, 2012)	CABI, 2012; Hall et al., 2008; Sagarra and Peterkin, 1999	F, L, S (ICA, 2010)	[Yes]	No
<i>Nipaecoccus jonmartini</i> Williams & Granara de Willink	CO (Ben-Dov et al., 2010; Kondo, 2001; Williams and Granara, 1992)	Ben-Dov et al., 2010; Williams and Granara, 1992	L (Kondo, 2011b)	Yes	No
<i>Nipaecoccus nipae</i> Maskell Syn.: <i>Pseudococcus nipae</i> (Maskell)	CO (Ben-Dov et al., 2007; CABI, 2010; Figueroa, 1977; Posada, 1989); US (Ben-Dov et al., 2007; CABI, 2010)	CABI, 2010; Ebeling, 1959; Figueroa, 1977; Posada, 1989	N/A	No	N/A
<i>Paraputo olivaceus</i> (Cockerell) Syn.: <i>Farinococcus olivaceus</i> (Cockerell)	CO (Ben-Dov et al., 2010); US (Ben-Dov et al., 2010; Miller et al., 2005)	Ebeling, 1959	N/A	No	N/A
<i>Planococcus citri</i> Risso	CO (Ben-Dov et al., 2007; Bernal and Diaz, 2006; CABI, 2010; Figueroa, 1977; Posada, 1989; Williams and Granara, 1992); US (Ben-Dov et al., 2007; CABI, 2010)	Ben-Dov et al., 2007; Bernal and Diaz, 2006; Ebeling, 1959; Figueroa, 1977; Gallego and Velez; Posada, 1989	N/A	No	N/A
<i>Pseudococcus comstocki</i> (Kuwana)	CO (Ben-Dov et al., 2007; Figueroa, 1977; Posada, 1989); US (Ben-Dov, 1994; CABI, 2010)	Ebeling, 1959	N/A	No	N/A

¹⁹ *Maconellicoccus hirsutus* is present in Colombia with restricted distribution, under official control due to few occurrences within the following Departments: Arauca, Atlántico, Cordoba, La Guajira, Magdalena, Norte de Santander, San Andres, and Sucre (ICA, 2008, 2010; 2012; Kondo et al., 2008). High temperatures in those areas are not favorable climatic for the production of ‘Hass’ avocado. The avocado plants surveyed in the aforementioned Colombian region may correspond to other hosts and cultivars different from ‘Hass’ avocado. This is supported by data showing current ‘Hass’ avocado production areas in Colombia (Consejo Nacional del Aguacate, 2011a) where *M. hirsutus* has not been found (ICA, 2010). However, we further analyze this pest in this document. conditions for the production of ‘Hass’ avocado. The avocado plants surveyed in those Colombian regions may correspond to other hosts and cultivars different from ‘Hass’ avocado. This is supported by data showing current ‘Hass’ avocado production areas in Colombia (Consejo Nacional del Aguacate, 2011a) where *M. hirsutus* has not been found (ICA, 2010). Additionally, standard harvest and postharvest processes described make this external pest unlikely to follow the pathway (see Appendix A). Therefore, we consider that this pest is unlikely to be present in the pathway.

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Pseudococcus longispinus</i> (Tarioni-Tozzetti) Syn.: <i>P. adonidum</i> (L.)	CO (Ben-Dov, 1994; CABI, 2010; Figueroa, 1977; Kondo, 2001; Posada, 1989; Williams and Granara, 1992); US (Ben-Dov, 1994; CABI, 2010)	Ben-Dov, 1994; Ben-Dov et al., 2007; CABI, 2010; Ebeling, 1959; Peña et al., 2002; Waite and Martinez, 2002	N/A	No	N/A
<i>Pseudococcus maritimus</i> (Ehrhorn)	CO (Ben-Dov et al., 2007; Figueroa, 1977; Kondo, 2001); US (Ben-Dov et al., 2010)	Ebeling, 1959	N/A	No	N/A
<i>Puto barberi</i> Cockerell	CO (Ben-Dov et al., 2007; Posada, 1989; Williams and Granara, 1992)	Ben-Dov et al., 2007	R (Posada, 1989)	Yes	No
Hemiptera: Psyllidae					
<i>Trioza magnoliae</i> Ashmead	CO (Bernal and Diaz, 2006; Cardenas and Posada, 2001; Castaño, 1983; Figueroa, 1977; Posada, 1989; Saldarriaga, 1977); US (Mead, 1963)	Bernal and Diaz, 2006; Cardenas and Posada, 2001; Figueroa, 1977; Saldarriaga, 1977	N/A	No	N/A
<i>Trioza perseae</i> Tuthill	CO (Bernal and Diaz, 2006; Figueroa, 1977; Gallego and Vélez, 1992; Saldarriaga, 1977)	Bernal and Diaz, 2006; Figueroa, 1977; Gallego and Vélez, 1992; Peña et al., 2002; Posada, 1989	L (Bernal and Diaz, 2006; Gallego and Vélez, 1992; Peña et al., 2002)	Yes	No
Hemiptera: Tingidae					
<i>Corythucha</i> sp.	CO (Posada, 1989)	Posada, 1989	L (Posada, 1989)	Yes	No
<i>Pleseobyrsa boliviana</i> Drake and Poor	CO (Posada, 1989; Saldarriaga, 1977)	Posada, 1989	L (Posada, 1989)	Yes	No
<i>Pleseobyrsa chiriquensis</i> (Champion)	CO (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)	Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989	L (Gallego and Vélez, 1992; Posada, 1989)	Yes	No
Hymenoptera: Formicidae					
<i>Acromyrmex octospinosus</i> (Reich)	CO (Figueroa, 1977)	CABI, 2010	L (Wetterer et al., 1998)	Yes	No
<i>Atta cephalotes</i> (Linne.)	CO (CABI, 2010; Figueroa, 1977)	CABI, 2010; Castaño, 1983	L (CABI, 2010)	Yes	No

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Atta sexdens</i> Linnaeus	CO (CABI, 2010; Posada, 1989)	Ebeling, 1959; Peña et al., 2002	L (CABI, 2010; Peña et al., 2002; Posada, 1989)	Yes	No
<i>Crematogaster brevispinosa</i> Mayr	CO (Figueroa, 1977; Posada, 1989)	Ebeling, 1959	Br (Figueroa, 1977); S (Figueroa, 1977; Posada, 1989)	Yes	No
<i>Linepithema humile</i> Mayr Syn.: <i>Iridomyrmex humilis</i> Mayr	CO (Gallego and Vélez, 1992); US (Ebeling, 1959)	Ebeling, 1959	N/A	No	N/A
<i>Solenopsis geminata</i> (Fabricius)	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989); US (CABI, 2010; Ebeling, 1959)	CABI, 2010; Ebeling, 1959; Hill, 1983	N/A	No	N/A
Isoptera: Kalotermitidae					
<i>Neotermes castaneus</i> (Burmeister)	CO (Constantino, 2001); US (Ebeling, 1959)	Ebeling, 1959	N/A	No	N/A
Isoptera: Rhinotermitidae					
<i>Coptotermes niger</i> Snyder.	CO (Constantino, 2001)	Ebeling, 1959	R (López, 2002)	Yes	No
<i>Heterotermes tenuis</i> (Hagen)	CO (Belloti et al., 2002; Constantino, 2001)	Ebeling, 1959	R, S (Belloti et al., 2002)	Yes	No
Lepidoptera: Arctiidae					
<i>Turuptiana obliqua</i> Walker	CO (Ebeling, 1959; Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989)	Ebeling, 1959; Figueroa, 1977; Gallego and Vélez, 1992	L (Figueroa, 1977; Posada, 1989; Cardenas and Posada, 2001)	Yes	No
Lepidoptera: Gracillariidae					
<i>Phyllocnistis perseafolia</i> (Davis and Wagner, sp. n.)	CO (Davis and Wagner, 2011)	Davis and Wagner, 2011	L, F (Davis and Wagner, 2011)	Yes	Yes ²⁰
Lepidoptera: Oecophoridae					

²⁰ This leaf-miner damages the surface of avocado fruit, mining the skin but not the pulp (Posada-Florez, 2011), and damage is visible and easily recognized. The pest is therefore highly likely to be removed during the standard postharvest processes of washing/brushing and culling. We did not consider this pest for further mitigation.

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Stenoma catenifer</i> Walsingham	CO (Bernal and Diaz, 2006; CABI, 2010; Carvajal, 2005; Cardenas and Posada, 2001; Zhang, 1994)	Bernal and Diaz, 2006; CABI, 2010; Ebeling, 1959; Posada, 1987; Robinson et al., 2011; Waite and Martinez, 2002; Zhang, 1994	F, Sd (CABI, 2010; Carvajal, 2005; L (Atehortua de la cuesta, 1975); S (CABI, 2010)	Yes	Yes
Lepidoptera: Geometridae					
<i>Automeris illustris</i> Walker	CO (Figueroa, 1977)	Figueroa, 1977	L (Figueroa, 1977)	Yes	No
<i>Glena bisulca</i> Rindge	CO (Gallego and Vélez, 1992; Posada, 1989)	ICA, 1980	L (Madrigal, 1986; Posada, 1989)	Yes	No
<i>Oxydia vesulia</i> Cramer Syn.: <i>Choerodes transponens</i> (Walker)	CO (Figueroa, 1977; Posada, 1989); US (Zhang, 1994; NIS, 2011a)	Glenn et al., 2003	N/A	No	N/A
Lepidoptera: Lasiocampidae					
<i>Euglyphis fibra</i> Schaus	CO (Posada, 1989)	Ebeling, 1959; Posada, 1989; Robinson et al., 2011; Zhang, 1994	L (Posada, 1989)	Yes	No
Lepidoptera: Megalopygidae					
<i>Megalopyge lanata</i> Stoll	CO (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977; Zhang, 1994)	Figueroa, 1977; Posada, 1989; Robinson et al., 2011; Saldarriaga, 1977	L (Figueroa, 1977; Madrigal, 1986; Posada, 1989)	Yes	No
<i>Megalopyge orsilochus</i> Cramer	CO (Cardenas and Posada, 2001; Posada, 1989)	Cardenas and Posada, 2001; Posada, 1989	L (Cardenas and Posada, 2001; Posada, 1989)	Yes	No
Lepidoptera: Limacodidae					
<i>Phobetron hipparchia</i> Cramer	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989; Saldarriaga, 1977; Zhang, 1994)	Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	L (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)	Yes	No
<i>Sibine nesea</i> Stoll	CO (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)	Figueroa, 1977; Posada, 1989; Robinson et al., 2011; Saldarriaga, 1977	L (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)	Yes	No
Lepidoptera: Noctuidae					

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Anicla infecta</i> (Ochsenheimer)	CO (ICA, 1986); US (Pogue, 2006)	ICA, 1986	N/A	No	N/A
<i>Chrysodeixis includens</i> Walker Syn.: <i>Pseudoplusia includens</i> Walker	CO (CABI, 2010; Posada, 1989; Zhang, 1994); US (CABI, 2010; Zhang, 1994)	CABI, 2010; Ebeling, 1959; Robinson et al., 2011	N/A	No	N/A
<i>Helicoverpa zea</i> (Boddie)	CO (CABI, 2010); US (CABI, 2010; Zhang, 1994)	Ebeling, 1959; Robinson et al., 2011	N/A	No	N/A
<i>Peridroma saucia</i> Hübner	CO (CABI, 2010); US (CABI, 2010)	Robinson et al., 2011	N/A	No	N/A
<i>Spodoptera eridania</i> Cramer (Stoll)	CO (Posada, 1989); US (CABI, 2010; Zhang, 1994)	Robinson et al., 2011	N/A	No	N/A
<i>Spodoptera latifacia</i> (Walker)	CO (Figueroa, 1977); US (Zhang, 1994; NIS, 2011b)	Gallego and Vélez, 1992	N/A	No	N/A
Lepidoptera: Psychidae					
<i>Oiketicus geyeri</i> Berg	CO (Bernal and Diaz, 2006; Carvajal, 2005; Posada, 1989; Saldarriaga, 1977)	Bernal and Diaz, 2006; Carvajal, 2005; Castaño, 1983; Posada, 1989; Saldarriaga, 1977	L (Bernal and Diaz, 2006; Posada, 1989)	Yes	No
<i>Oiketicus kirbyi</i> Guilding Syn: <i>O. poeyi</i> Lucas	CO (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977; Zhang, 1994)	Castaño, 1983; Figueroa, 1977; Peña et al., 2002; Robinson et al., 2011; Saldarriaga, 1977	L (Peña et al., 2002; Posada, 1989)	Yes	No
Lepidoptera: Pyralidae					
<i>Jocara conspiciualis</i> Lederer	CO (Figueroa, 1977; Posada, 1989, Cardenas and Posada, 2001; Saldarriaga, 1977)	Figueroa, 1977; Posada, 1989; Cardenas and Posada, 2001; Saldarriaga, 1977	L (Posada, 1989; Cardenas and Posada, 2001)	Yes	No
<i>Jocara subcurvularis</i> Shaus	CO (Bernal and Diaz, 2006; Saldarriaga et al., 1977)	Bernal and Diaz, 2006; Saldarriaga et al., 1977	L (Bernal and Diaz, 2006; Saldarriaga et al., 1977)	Yes	No
<i>Parayelois transitella</i> (Walker) Syn. <i>Amyelois transitella</i> (Walker)	CO (Posada, 1989); US (Burks and Brandl, 2004; Kuenen and Siegel, 2009; Niu et al., 2009)	Posada, 1989	N/A	No	N/A
Lepidoptera: Saturniidae					

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Copaxa andensis</i> Lemaire	CO (Amarillo, 2000)	Robinson et al., 2011	L (Amarillo, 2008)	Yes	No
<i>Copaxa decrescens</i> Walker	CO (Amarillo, 2000)	Robinson et al., 2011	L (Dorantes et al., 2006)	Yes	No
<i>Copaxa denhezi</i> Lemaire	CO (Amarillo, 2000; Robinson et al., 2011)	Robinson et al., 2011	L (Amarillo, 2008)	Yes	No
<i>Copaxa multifenestrata</i> (Heinrich-Shaffer)	CO (Amarillo, 2000)	Robinson et al., 2011; Zhang, 1994	L (Dorantes et al., 2006; Teliz, 2000)	Yes	No
<i>Copaxa rufinans</i> Schaus	CO (Amarillo, 2000)	Janzen and Hallwachs, 2005; Robinson et al., 2011	L (Amarillo, 2008)	Yes	No
<i>Copaxa simson</i> Mass. & Weym.	CO (Amarillo, 2000; Figueroa, 1977)	Robinson et al., 2011	L (Amarillo, 2008)	Yes	No
<i>Eacles imperialis</i> Drury	CO (Amarillo, 2000; Figueroa, 1977); US (Opler et al., 2011)	Ebeling, 1959; Figueroa, 1977; Robinson et al., 2011	N/A	No	N/A
<i>Hylesia continua</i> (Walker)	CO (Amarillo, 2000)	Janzen and Hallwachs, 2005; Robinson et al., 2011	L (Janzen and Hallwachs, 2005)	Yes	No
<i>Hylesia</i> sp.	CO (Posada, 1989)	Posada, 1989	L (Posada, 1989)	Yes	No
<i>Periphoba arcae</i> Druce	CO (Amarillo, 2000)	Janzen and Hallwachs, 2005	L (Arco-verde, 2002)	Yes	No
<i>Rothschildia orizaba</i> Westwood	CO (Amarillo, 2000; Figueroa, 1977; Posada, 1989)	Robinson et al., 2011	L (Figueroa, 1977; Posada, 1989)	Yes	No
Lepidoptera: Tortricidae					
<i>Amorbia essigana</i> Busk	CO (Figueroa, 1977); US (Calabrese, 1992; Ebeling, 1959; Zhang, 1994)	Calabrese, 1992; Ebeling, 1959; Figueroa, 1977; Waite and Martinez, 2002; Zhang, 1994	N/A	No	N/A
<i>Argyrotaenia</i> sp.	CO (Posada, 1989)	ICA, 1978; Posada, 1989	L (Posada, 1989)	Yes	No
<i>Cryptaspasma</i> sp. near to <i>lugubris</i> (Felder)	CO (ICA, 1985; Gallego and Vélez, 1992)	Brown and Brown, 2004; Gallego and Vélez, 1992	F, Sd (Gallego and Vélez, 1992)	Yes	No ²¹

²¹ This genus has a reportable status for the United States (PestID, 2011). *Cryptaspasma* sp. near to *lugubris* has been reported in Colombia (Gallego and Vélez, 1992), and specimens were identified (ICA, 1985). Gallego and Vélez (1992) describe this pest as a fruit and seed borer without detailed information on biology. Research studies on the biology of

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Gymnandrosoma</i> sp.	CO (Posada, 1989)	Posada, 1989	F (Posada, 1989)	Yes	Yes
<i>Platynota rostrana</i> Walker	CO (Posada, 1989); US (Brown and Brown, 2005; Robinson et al., 2011; Zhang, 1994)	Robinson et al., 2011	N/A	No	N/A
Thysanoptera: Thripidae					
<i>Frankliniella bruneri</i> Watson	CO (NAPPO, 2000; PestID, 2011)	Johansen et al., 1999; Teliz, 2000	F, Fl (Johansen et al., 1999; Peña et al., 2002); F ²² (PestID, 2011)	Yes	No ²³
<i>Frankliniella gardeniae</i> Moulton	CO (Cárdenas and Posada, 2001; Echeverri et al., 2004)	Cárdenas and Posada, 2001; Echeverri et al., 2004	F, Fl (Echeverri et al., 2004; Cárdenas and Posada, 2001); F (PestID, 2011)	Yes	No ²⁴
<i>Frankliniella insularis</i> Franklin	CO (Zapata et al., 1994)	Valle-De la Paz et al., 2003	N/A	No	N/A
<i>Frankliniella occidentalis</i> (Pergande)	CO (Bernal and Diaz, 2006; EPPO and CABI, 1997; CABI, 2010; Gallego and Velez, 1992); US (EPPO and CABI, 1997; CABI, 2010)	Sanchez, 2000	N/A	No	N/A

Cryptaspasma are inconclusive about whether or not larvae can infest fruit in field conditions (Hoddle and Hoddle, 2008). This pest has been reared from bare seeds in dropped avocados (Brown and Brown, 2004; Hoddle and Hoddle, 2008) and from harvested fruits commingled with fruits from the ground (Hoddle and Hoddle, 2008). However, inability to rear the insect from fruits directly picked from trees may be due to altitude restricting pest occurrence (Brown and Brown, 2004; Hoddle and Hoddle, 2008). Additionally, the pest has not been intercepted in avocado from countries where the pest exists (PestID, 2011). From the information available we conclude this pest is highly unlikely to follow the pathway and it is not further analyzed in this document. If more information or interceptions becomes available in the future, its status could change.

²² Intercepted on fruits of commodities other than *Persea americana*.

²³ *Frankliniella bruneri* is found on young avocado fruits and foliar structures (Johansen et al., 1999). Thus, this pest is not expected to follow the pathway because attacked fruits will not meet the quality required for fruit exportation and will be excluded during the standard post-harvest process that includes grading, washing, and brushing activities (see Appendix A).

²⁴ *Frankliniella gardeniae* was collected on leaves, young fruits, and most frequently on avocado flowers (79%); however, direct damage is not clear because it was always found interacting with *Heliothrips haemorrhoidalis* (Echeverry et al., 2004). Most species of this genus are anthophilic. The damage these pests cause on young fruits includes pericarp distortion and parthenocarpy (Echeverry et al., 2004). *Frankliniella gardeniae* is considered an external feeder and damaged fruits are not marketable. Thus, this pest is highly unlikely to remain on the fruit following the standard post-harvest process for avocados in Colombia (see Appendix D).

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Heliothrips haemorrhoidalis</i> Bouché	CO (Bernal and Diaz, 2006; CABI, 2010; Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989); US (CABI, 2011)	Bernal and Diaz, 2006; CABI, 2010; Calabrese, 1992; Ebeling, 1959; Peña et al., 2002; PestID, 2001; Posada, 1989; Waite and Martinez, 2002	N/A	No	N/A
<i>Neohydatothrips burungae</i> Hood	CO (Castafto and Henao, 1997)	Hoddle, 2006; Hoddle, 2007	N/A	No	N/A
<i>Selenothrips rubrocinctus</i> (Giard)	CO (CABI, 2010; Figueroa, 1977; Posada, 1989); US (CABI, 2010; Peña, 2003; Waite and Martinez, 2002)	Bernal and Diaz, 2006; Calabrese, 1992; Ebeling, 1959; Hill, 1983; Lynce, 2007	N/A	No	N/A
<i>Thrips palmi</i> Karny	CO (Duran et al., 1999; CABI, 2010); US (CABI, 2010)	CABI, 2010; Duran et al., 1999	F, L (CABI, 2010; Duran et al., 1999)	Yes	Yes ²⁵
NEMATODES²⁶					
<i>Helicotylenchus dihystra</i> (Cobb) Sher.	CO (Buriticá, 1999; Saltaren et al., 1998); US (CABI, 2010)	CABI, 2010; Ferris, 2010; Saltaren et al., 1998	N/A	No	N/A
<i>Helicotylenchus erythrinae</i> (Zimmermann) Golden	CO (Buriticá, 1999)	Ferris, 2010	R (Zuñiga et al., 1979)	Yes	No
<i>Helicotylenchus multicinctus</i> (Cobb) Golden	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010)	CABI, 2010	N/A	No	N/A
<i>Helicotylenchus pseudorobustus</i> (Steiner) Golden	CO, US (CABI, 2010)	CABI, 2010; Ferris, 2010	N/A	No	N/A
<i>Helicotylenchus</i> sp.	CO (Bernal and Diaz, 2006; Saltaren et al., 1998)	Bernal and Diaz, 2006; Saltaren et al., 1998	R (Bernal and Diaz, 2006; Saltaren et al., 1998)	Yes	No
<i>Meloidogyne</i> sp.	CO (Saltaren et al., 1998)	Saltaren et al., 1998	R (Saltaren et al., 1998)	Yes	No

²⁵*Thrips palmi* is likely to be present on the fruit surface, especially during the first stage of fruit development, producing scraping and deformities; however, this insect is not likely to remain on the surface of developed fruit, because they prefer to stay under leaves (Duran et al., 1999). Furthermore, the smooth skin of this fruit, which is being exported without stem, is not conducive for thrips to remain on the fruit, especially given the standard postharvest practices here of washing, brushing, and culling. Therefore, we did not consider this pest for further mitigation.

²⁶Taxonomy of nematodes per Siddiqi (2000).

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Paratrichodorus minor</i> (Colbran) Siddiqi	CO (Buriticá, 1999); US (CABI, 2010)	Ferris, 2010	N/A	No	N/A
<i>Pratylenchus brachyurus</i> (Godfrey) Filipjev Schuurmans and Stekhoven	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010)	CABI, 2010	N/A	No	N/A
<i>Pratylenchus neglectus</i> (Rensch) Filipjev and Schuurmans Stekhoven	CO (Buriticá, 1999); US (University of Nebraska, 2008)	Ferris, 2010	N/A	No	N/A
<i>Pratylenchus penetrans</i> (Cobb) Filipjev and Schuurmans Stekhoven	CO (Buriticá, 1999); US (CABI, 2010)	CABI, 2010; Ferris, 2010	N/A	No	N/A
<i>Pratylenchus thornei</i> Sher and Allen	CO (Buriticá, 1999); US (CABI, 2010)	Ferris, 2010	N/A	No	N/A
<i>Radopholus similis</i> (Cobb) Thorne	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010)	CABI, 2010; Ferris, 2010; Wellman, 1977	N/A	No	N/A
<i>Rotylenchulus reniformis</i> Linford and Oliveira	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010)	CABI, 2010; Ferris, 2010	N/A	No	N/A
<i>Trichodorus</i> sp.	CO (CABI, 2010)	CABI, 2010	L, R (CABI, 2010)	Yes	No
<i>Tylenchulus semipenetrans</i> Cobb	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010)	Ferris, 2010	N/A	No	N/A
FUNGI and CHROMISTANS²⁷					
<i>Aithaloderma citri</i> (Briosi & Pass.) Woron., Syn: <i>Meliola penzigii</i> Sacc., <i>Capnodium citri</i> Penz.	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Albonectria rigidiuscula</i> (Berk. And Broome) Rossman and Samuels, Anamorph: <i>Nectria rigidiuscula</i> Berk. and Broome, Syn: <i>Fusarium decemcellulare</i> C. Brick	CO (Buriticá, 1999; CABI, 2010); US (FL, OK) (CABI, 2010; Farr and Rosman, 2011)	CABI, 2010; Farr and Rossman, 2011	N/A	No	N/A
<i>Alternaria alternata</i> (Fr.: Fr) Keissl.	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	CABI, 2010; Farr and Rossman, 2011	N/A	No	N/A
<i>Alternaria citri</i> Ellis and N. Pierce	CO (Buriticá, 1999); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A

²⁷ Fungal classification and nomenclature are written according SMML (Farr and Rossman, 2011).

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Armillaria mellea</i> (Vahl: Fr) P. Kumm	CO (Buriticá, 1999; CABI, 2010; Farr and Rossman, 2011); US (CABI, 2010; Farr and Rossman, 2011)	Alvarez de la Peña, 1981; Bernal and Diaz, 2005; Farr and Rossman, 2011	N/A	No	N/A
<i>Aspergillus niger</i> Tiegh.	CO (Buriticá, 1999); US (CABI, 2010)	Farr and Rossman, 2011	N/A	No	N/A
<i>Aspergillus</i> sp.	CO (Buriticá, 1999; Saltaren et al., 1998)	Farr and Rossman, 2011; Saltaren et al., 1998	L (Saltaren et al., 1998)	Yes	Yes
<i>Asteridiella perseae</i> (F. Stevens) Hansf., Syn: <i>Irene perseae</i> (F. Stevens) Toro	CO (Bernal and Diaz, 2006; Buriticá, 1999; Farr and Rossman, 2011); US (FL) (Farr and Rossman, 2011)	Bernal and Diaz, 2006; Buriticá, 1999; Farr et al., 1989	L, F (Bernal and Diaz, 2006)	[Yes] ³	No ²⁸
<i>Athelia rolfsii</i> (Curzi) C.C. Tu and Kimbr., Syn: <i>Corticium rolfsii</i> Curzi, <i>Pellicularia rolfsii</i> (Curzi) E. WestAnamorph: <i>Sclerotium rolfsii</i> (Curzi) Sacc.	CO (CABI, 2010; Farr and Rossman, 2011); US (CABI, 2010; Farr et al., 2008)	Farr and Rossman, 2011	N/A	No	N/A
<i>Botryosphaeria dothidea</i> (Moug.:Fr) Ces.and De Not.,Anamorph: <i>Fusicoccum aesculi</i> Corda	CO (Rodas, 1997); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Botryosphaeria obtusa</i> (Schwien.) Shoemaker Syn: <i>Physalospora obtusa</i> (Schwein.) Cooke, <i>Physalospora cydonea</i> G. Arnaud Anamorph: <i>Diplodia seriata</i> De Not.	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Botryosphaeria rhodina</i> (Berk. and M.A. Curtis) Arx, Anamorph: <i>Lasiodiplodia theobromae</i> (Pat.) Griffiths and Maubl. Syn: <i>Botryodiplodia theobromae</i> (Pat.) Griffiths and Maubl.	CO (Buriticá, 1999; Farr and Rossman, 2011); US (Farr and Rossman, 2011)	Buriticá, 1999; Farr and Rossman, 2011;	N/A	No	N/A

²⁸ *Asteridiella perseae* (black mildew) is a plant-parasitic fungus; the symptom is a highly visible, dense, velvety covering on the fruit (Tamayo, 2007). Thus, this pathogen is highly unlikely to be harvested (see Appendix A), or to follow the pathway.

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Botryosphaeria ribis</i> Gross. & Duggar Anamorph: <i>Neofusicoccum ribis</i> (Slippers, Crous & M.J. Wingf.) Crous, Slippers & A.J.L. Phillips	CO (CABI, 2010; Farr and Rossman, 2011; Morales et al., 2005); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Botryotinia fuckeliana</i> (de Bary) Whetzel Anamorph: <i>Botrytis cinerea</i> Pers.:Fr, Syn: <i>Botrytis vulgaris</i> Link:Fr	CO (Buriticá, 1999; CABI, 2010; Farr and Rossman, 2011); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Calonectria pauciramosa</i> C.L. Schoch and Crous Anamorph: <i>Cylindrocladium pauciramosum</i> C.L. Schoch and Crous	CO (Farr and Rossman, 2011)	Farr and Rossman, 2011	L, R (Crous, 2002)	Yes	No
<i>Calonectria scoparia</i> Terash., Anamorph: <i>Cylindrocladium scoparium</i> Morgan	CO (Morales et al., 2005; Varon de Agudelo, 1991); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Orh et al., 2003	N/A	No	N/A
<i>Calothyriolum apiahynum</i> Speg	CO (Buriticá, 1999; Tamayo, 2007)	Tamayo, 2007	F, L, S (Tamayo, 2007)	Yes	No ²⁹
<i>Capnodium</i> sp.	CO (Bernal and Diaz, 2006; Carvajal, 2005; Tamayo, 2007)	Bernal and Diaz, 2006; Carvajal, 2005; Farr and Rossman, 2011	F, L, S, (Bernal and Diaz, 2006; Carvajal, 2005)	Yes	Yes
<i>Ceratocystis fimbriata</i> Ellis and Halst.	CO (Buriticá, 1999; Castrillon and Urrea, 2000); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Cochliobolus lunatus</i> Nelson and Haasis Anamorph: <i>Curvularia lunata</i> (Wakk.) Boedijn Syn: <i>Acrothecium lunatum</i> Wakk	CO (Buriticá, 1999; Farr and Rossman, 2011); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A

²⁹ *Calothyriolum apiahynum* (sooty mold, Capnodiales) is a microorganism associated with avocados (Bernal and Diaz, 2006; Rivero, 2008; Tamayo, 2007). However, it does not infect plant tissues and is considered a non-parasitic fungus (Nelson, 2008b). It generally grows on the surface of fruits, leaves, and stems on the exudates of aphids or sucking insect infestations; it forms a black velvety covering (Crous et al., 2009). This pest is highly unlikely to follow the pathway, because damaged fruit will either not be harvested, or will be removed during standard post-harvest processing (see Appendix D).

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Colletotrichum crassipes</i> Spg. (Arx)	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Colletotrichum dematium</i> Pers.:Fr.) Grove	CO (Buriticá, 1999); US (CABI, 2010; Farr and Rossman, 2011)	Manaaki Whenua, 2008	N/A	No	N/A
<i>Corynespora cassiicola</i> (Berk. and M.A. Curtis) C.T. Wei	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Manaaki Whenua, 2008	N/A	No	N/A
<i>Cylindrocladium</i> sp.	CO (Bernal and Diaz, 2006; Saltaren et al., 1998; Tamayo, 2007)	Saltaren et al., 1998; Tamayo, 2007	L, R (Crous, 2002)	Yes	No
<i>Davidiella tassiana</i> (De Not.) Crous and U. Braun, Anamorph: <i>Cladosporium herbarum</i> (Pers.) Link, Syn: <i>Mycosphaerella tassiana</i> (De Not.) Johanson	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Wellman, 1977	N/A	No	N/A
<i>Diaporthe citri</i> Wolf Syn: <i>Phomopsis citri</i>	CO (Buriticá, 1999); US (CABI, 2010)	Wellman, 1977	N/A	No	N/A
<i>Dothiorella</i> sp.	CO (Tamayo, 2007)	Farr and Rossman, 2011; Tamayo, 2007; Wellman, 1977	S, R (Farr and Rossman, 2011)	Yes	No
<i>Epicoecum nigrum</i> Link	CO (Buriticá, 1999; Farr and Rossman, 2011); US (Farr and Rossman, 2011)	Manaaki Whenua, 2008	N/A	No	N/A
<i>Erysiphe betae</i> (Vanha) Weltzien Syn: <i>Oidium erysiphoides</i> Fr.	CO (Farr and Rossman, 2011; Jurado and Sañudo, 1988); US (CABI, 2010)	Farr and Rossman, 2011	N/A	No	N/A
<i>Erythriconium salmonicolor</i> (Berk. & Broome) Burds., Syn: <i>Corticium salmonicolor</i> Berk. and Br., Anamorph: <i>Necator decretus</i> Massee	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A
<i>Fusarium incarnatum</i> (Desm.) Sacc. Syn: <i>Fusarium semitectum</i> Berk. & Ravenel	CO (Farr and Rossman, 2011); US (Farr and Rossman, 2011)	Manaaki Whenua, 2008	N/A	No	N/A

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Fusarium oxysporum</i> Schlechtend.: Fr.	CO (Buriticá, 1999; Farr and Rossman, 2011); US (CABI, 2010; Farr and Rossman, 2011)	CABI, 2010; Farr and Rossman, 2011; Manaaki Whenua, 2008	N/A	No	N/A
<i>Fusarium roseum</i> Link	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Wellman, 1977	N/A	No	N/A
<i>Fusarium</i> sp.	CO (Tamayo, 2007)	Tamayo, 2007	L, S (Tamayo, 2007)	Yes ⁷	N/A
<i>Ganoderma lucidum</i> (Curtis: Fr.) P. Karst Syn.: <i>Polyporus lucidus</i> (Curtis: Fr.) Fr.	CO (Buriticá, 1999; CABI, 2010; Morales et al., 2005); US (CABI, 2010; Farr and Rossman, 2011)	CABI, 2010; Farr and Rossman, 2011; Morales et al., 2005	N/A	No	N/A
<i>Gibberella avenacea</i> R.J. Cooke Anamorph: <i>Fusarium avenaceum</i> (Fr.: Fr.) Sacc.	CO (Buriticá, 1999); US (CABI, 2010; Farr and Rossman, 2011)	CABI, 2010; Farr and Rossman, 2011	N/A	No	N/A
<i>Gibberella pulicaris</i> (Fr.) Sacc. Anamorph: <i>Fusarium sambucinum</i> Fckl.	CO (Buriticá, 1999; Farr and Rossman, 2011); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A
<i>Gibberella zeae</i> (Schwein.) Petch Anamorph: <i>Fusarium graminearum</i> Schwabe	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011; Manaaki Whenua, 2008	N/A	No	N/A
<i>Globisporangium debaryanum</i> (R. Hesse) Uzuhashi, Tojo & Kakish., Syn.: <i>Pythium debaryanum</i> Auct. Non R. Hesse, <i>Eupythium debaryanum</i> (R. Hesse)	CO (Buriticá, 1999; CABI, 2010; Farr and Rossman, 2011); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011; Manaaki Whenua, 2008	N/A	No	N/A
<i>Globisporangium splendens</i> (Hans Braun) Uzuhashi, Tojo & Kakish. Syn: <i>Pythium splendens</i> H. Braun	CO (CABI, 2010); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Glomerella acutata</i> Guerber & J.C. Correll Anamorph: <i>Colletotrichum acutatum</i> J.H. Simmonds	CO (CABI, 2010; EPPO and CABI, 1997); US (CABI, 2010; EPPO and CABI, 1997)	Farr and Rossman, 2011; Manaaki Whenua, 2008	N/A	No	N/A

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Glomerella cingulata</i> (Stoneman) Splaud. & Schrenk Anamorph: <i>Colletotrichum gloeosporioides</i> (Penz.) Penz. & Sacc.	CO (Bernal and Diaz, 2006; Buriticá, 1999; CABI, 2010; Carvajal, 2005); US (CABI, 2010; Farr and Rossman, 2011)	Bernal and Diaz, 2006; Buriticá, 1999; CABI, 2010; Farr and Rossman, 2011	N/A	No	N/A
<i>Hematonectria haematococca</i> (Berk. & Broome) Samuels & Rossman Syn. <i>Nectria haematococca</i> Berk. & Broome, Anamorph: <i>Fusarium solani</i> (Mart.) Sacc.	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Hypocrea rufa</i> (Pers.:Fr.) Fr., Anamorph: <i>Trichoderma viride</i> Pers.:Fr., Syn: <i>T. lignorum</i> (Tode) Harz	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A
<i>Khuskia oryzae</i> H.J. Huds Anamorph: <i>Nigrospora oryzae</i> (Berk. and Curt.) Petch.	CO (Buriticá, 1999; Farr and Rossman, 2011); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011; CABI, 2010; Wellman, 2007	N/A	No	N/A
<i>Laetiporus sulphureus</i> (Bull.:Fr) Murrill Syn.: <i>Polyporus sulphureus</i> , Anamorph: <i>Sporotrichum versisporum</i> (C. G. Lloyd) Stalpers	CO (Buriticá, 1999; Morales et al., 2005); US (Farr and Rossman, 2011)	Morales et al., 2005	N/A	No	N/A
<i>Lembosia perseae</i> Orejuela	CO (Buritica, 1999; Bernal and Diaz, 2006; Farr and Rossman, 2011)	Buritica, 1999; Bernal and Diaz, 2006; Tamayo, 2007	L, F (Bernal and Diaz, 2006)	Yes	No ³⁰
<i>Leptosphaerulina trifolii</i> (Rostr.) Petr. Syn.: <i>Pseudoplea trifolii</i> (Rostr.) Petr.	CO (Buriticá, 1999; Farr and Rossman, 2011); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A

³⁰ *Lembosia perseae* (sooty mold, Capnodiales) is a microorganism associated with avocados (Bernal and Diaz, 2005; Rivero, 2008). However, it does not infect plant tissues and is considered a non-parasitic fungus (Nelson, 2008b). It generally grows on the surface of the fruits, leaves, and stems on the exudates of aphids or sucking insect infestations; it forms a black velvety covering (Crous et al., 2009). We do not consider it to follow the pathway, because the cosmetic damage it causes will either result in the fruit being culled or being washed off fruits in post-harvest processing (see Appendix D).

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Macrophomina phaseolina</i> (Tassi) Goid Syn: <i>Macrophomina phaseoli</i> (Maubl.) S.F. Ashby	CO (Buriticá, 1999; CABI, 2010; Farr and Rossman, 2011); US (CABI, 2010)	Farr and Rossman, 2011	N/A	No	N/A
<i>Meliola antioquensis</i> Garcés	CO (Bernal and Diaz, 2006; Buritica, 1999; Farr and Rossman, 2011)	Buritica, 1999; Bernal and Diaz, 2006	N/A	No	N/A
<i>Microthia havanensis</i> (Bruner) Gryzenh. & M.J. Wingf. Syn: <i>Cryphonectria havanensis</i> (Bruner) Barr, <i>Endothia havanensis</i> Bruner	CO (Buriticá, 1999); US (FL) (Farr and Rossman, 2011)	Farr and Rossman, 2011; Wellman, 1977	Br (Wellman, 1977)	[Yes] ³	No
<i>Neonectria ditissima</i> (Tul. & C. Tul.) Samuels & Rossman Syn: <i>Nectria galligena</i> Bres. Anamorph: <i>Cylindrocarpon heteronemum</i> (Berk. and Broome) Wollenw.	CO (Buriticá, 1999; Morales et al., 2005); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011; Villalobos and Cárdenas; 2002	N/A	No	N/A
<i>Nectria pseudotrachia</i> (Schwein) Berk. & M.A. Curtis, Anamorph: <i>Tubercularia lateritia</i> (Berk.) Seifert	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A
<i>Nigrospora sphaerica</i> (Sacc.) E.W. Mason	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Manaaki Whenua, 2008	N/A	No	N/A
<i>Pellicularia koleroga</i> Cooke, Syn.: <i>Corticium koleroga</i> (Cooke) Hühnel	CO (Buriticá, 1999; Farr and Rossman, 2011); US (Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Penicillium digitatum</i> (Pers.:Fr.) Sacc.	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Wellman, 1977	N/A	No	N/A
<i>Penicillium italicum</i> Wehm.	CO (Buriticá, 1999); US (CABI, 2010; Farr and Rossman, 2011)	Wellman, 1977	N/A	No	N/A
<i>Pestalotiopsis disseminata</i> (Thuem.) Steyaert	CO (Buritica, 1999); US (FL) (Farr and Rossman, 2011)	Farr and Rossman, 2011	L (Farr and Rossman, 2011)	[Yes] ³	No

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Pestalotiopsis guepinii</i> (Desm.) Stey. Desm. Syn: <i>Pestalotia guepinii</i> Desm.	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Wellman, 1977	N/A	No	N/A
<i>Pestalotiopsis versicolor</i> (Speg.) Steyaert Syn.: <i>Pestalotia versicolor</i> Speg.	CO (Buritica, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Phyllachora gratissima</i> Rehm	CO (Buritica, 1999; Bernal and Diaz, 2006; Farr and Rossman, 2011)	Bernal and Diaz, 2006; Buritica, 1999; Farr and Rossman, 2011; Morales et al., 2005	F (PestID, 2011); L (PestID, 2011, Bernal and Diaz, 2006)	Yes	No ³¹
<i>Phytophthora cactorum</i> (Lebert and Cohn) J. Schröt	CO (Buriticá, 1999); US (CABI, 2010; Farr and Rossman, 2011)	CABI, 2010; Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A
<i>Phytophthora capsici</i> Leonian Syn.: <i>Phytophthora</i> <i>parasitica</i> var. <i>capsici</i> (Leonian) Sarej	CO (Buriticá, 1999); US (CABI, 2010)	Farr and Rossman, 2011	N/A	No	N/A
<i>Phytophthora cinnamomi</i> var. <i>cinnamomi</i> Rands Syn: <i>P. cinnamomi</i> Rands	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010)	Buriticá, 1999; CABI, 2010; Ploetz et al., 2003; Tamayo 2007	N/A	No	N/A
<i>Phytophthora citrophthora</i> (R.E. Sm. and E.H. Sm.) Leonian	CO (Buriticá, 1999); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Phytophthora megasperma</i> Drechsler	CO (Buriticá, 1999); US (Farr and Rossman, 2011; CABI, 2010)	Farr and Rossman, 2011	N/A	No	N/A
<i>Phytophthora nicotianae</i> Brenda de Haan Syn: <i>P. parasítica</i> Dasfur	CO (Buritica, 1999; CABI, 2010); US (CABI, 2010)	CABI, 2010; Wellman, 1977	N/A	No	N/A
<i>Phytophthora palmivora</i> var. <i>palmivora</i> (E.J. Butler) E.J. Butler Syn: <i>P. palmivora</i> (E.J. Butler) E.J. Butler	CO (Buriticá, 1999; Farr and Rossman, 2011; Morales et al., 2005); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A

³¹ *Phyllachora gratissima* has been intercepted three times on avocado fruits from Mexico (PestID, 2010). However, it is described as a pathogen that infects leaves and we found no references indicating that *P. gratissima* causes fruit damage (Bernal and Diaz, 2005; Morales et al., 2005; Orh et al., 2003; Ploetz et al., 2003; Teliz, 2000). Based on that evidence, this pathogen is highly unlikely to follow the pathway.

Pest	Geographic distribution¹	Reported on avocado	Plant part affected²	Quaran- tine pest	Follow pathway
<i>Phytophthora</i> sp.	CO (Buritica, 1999)	Farr and Rossman, 2011; Tamayo, 2007	F (Tamayo, 2007)	Yes	Yes
<i>Pseudocercospora purpurea</i> (Cooke) Deighton Syn: <i>Cercospora purpurea</i> Cooke.	CO (Bernal and Diaz, 2006; Tamayo, 2007); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Tamayo, 2007	N/A	No	N/A
<i>Pycnoporus sanguineus</i> (L.:Fr.) Murrill Syn.: <i>Polyporus sanguineus</i> Mont. and Berk.	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011	N/A	No	N/A
<i>Rigidoporus microporus</i> (Sw. Fr.) Overeem Syn.: <i>Polyporus lignosus</i> (Klotzsch) Imazeki	CO (Buriticá, 1999); US (CABI, 2010)	Farr and Rossman, 2011	N/A	No	N/A
<i>Rhizopus stolonifer</i> (Ehrenb.:Fr) Vuill. Syn.: <i>R. nigricans</i> Ehrenb	CO (Bernal and Diaz, 2006; Buriticá, 1999); Farr and Rossman, 2011; Tamayo, 2007); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Manaaki Whenua, 2008; Tamayo, 2007; Wellman, 1977	N/A	No	N/A
<i>Rosellinia bunodes</i> (Berk. & Broome) Sacc.	CO (Buriticá, 1999; Farr and Rossman, 2011; Morales et al., 2005)	Farr and Rossman, 2011; Ploetz et al., 2003; Wellman, 1977	R (Holliday, 1980; Wellman, 1977)	Yes	No
<i>Rosellinia necatrix</i> Prill. Anamorph: <i>Dematophora necatrix</i> Hart	CO (Buriticá, 1999; CABI, 2010; Farr and Rossman, 2011); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011; CABI, 2010; Ploetz et al., 2003; Wellman, 1977	N/A	No	N/A
<i>Rosellinia pepo</i> Pat.	CO (Buriticá, 1999; CABI, 2010)	CABI, 2010; Wellman, 1977	L, R, S (CABI, 2010)	Yes	No
<i>Rosellinia</i> sp.	CO (Tamayo, 2007)	Tamayo, 2007	R (Bernal and Diaz, 2006)	Yes	No
<i>Schizophyllum commune</i> (Fr.:Fr)	CO (Buriticá, 1999; Wellman, 1977); US (Farr and Rossman, 2011)	Manaaki Whenua, 2008	N/A	No	N/A
<i>Sclerotinia sclerotiorum</i> (Lib.) de Bary Anamorph: <i>Sclerotium varium</i> Pers. : Fr.	CO (Buriticá, 1999; CABI, 2010; Morales et al., 2005); US (CABI, 2010; Farr and Rossman, 2011)	Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Sphaceloma perseae</i> Jenkins	CO (Buritica, 1999; Bernal and Diaz, 2006; CABI, 2010; Carvajal, 2005); US (CABI, 2010; Farr and Rossman, 2011)	Bernal and Diaz, 2006; Buritica, 1999; Carvajal, 2005; Puerta, 1977; Wellman, 1977	N/A	No	N/A
<i>Thanatephorus cucumeris</i> (A. B. Frank) Donk Anamorph: <i>Rhizoctonia solani</i> Kühn	CO (Buriticá, 1999; CABI, 2010; Farr and Rossman, 2011); US (CABI, 2010; Farr and Rossman, 2011)	CABI, 2010; Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A
<i>Trametes versicolor</i> (L.:Fr.) Pilát Syn.: <i>Polyporus versicolor</i> L.	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	Farr and Rossman, 2011; Manaaki Whenua, 2008	N/A	No	N/A
<i>Trichothecium roseum</i> (Pers.:Fr.) Link Syn.: <i>Cephalothecium roseum</i> Corda	CO (Buriticá, 1999); US (Farr and Rossman, 2011)	CABI, 2010; Farr and Rossman, 2011	N/A	No	N/A
<i>Verticillium albo-atrum</i> Reinke and Berthier	CO (Buriticá, 1999; CABI, 2010; Morales et al., 2005); US (CABI, 2010; Farr and Rossman, 2011)	Alvarez de la Peña, 1981; Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A
<i>Verticillium dahliae</i> Kleb.	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010; Farr and Rossman, 2011)	CABI, 2010; Farr and Rossman, 2011; Manaaki Whenua, 2008; Lynce, 2007	N/A	No	N/A
<i>Verticillium</i> sp.	CO (Bernal and Diaz, 2006; Tamayo, 2007)	Bernal and Diaz, 2006; Farr and Rossman, 2011	S (PestID, 2011; Bernal and Diaz, 2006)	Yes	No
BACTERIA and PHYTOPLASMAS³²					
<i>Pectobacterium carotovorum</i> (Jones) Hauben et al. Syn: <i>Erwinia carotovora</i> .subsp. <i>carotovora</i> (Jones) Bergey et al.	CO (Buriticá, 1999; CABI, 2010); US (CABI, 2010)	Bradbury, 1986	N/A	No	N/A
<i>Pseudomonas syringae</i> Van Hall	CO (Buriticá, 1999); US (CABI, 2010)	CABI, 2010; Ploetz et al., 2003	N/A	No	N/A

³² Bacterial classification and nomenclature are written according to Euzéby (2011).

Pest	Geographic distribution ¹	Reported on avocado	Plant part affected ²	Quaran- tine pest	Follow pathway
<i>Rhizobium radiobacter</i> (Beijerinck and van Delden) Young et al. Syn: <i>Agrobacterium tumesfaciens</i>	CO (CABI, 2010; Buritica, 1999); US (CABI, 2010)	CABI, 2010	N/A	No	N/A
<i>Xanthomonas campestris</i> (Pammel) Dowson	CO (Buriticá, 1999; Morales et al., 2005); US (CABI, 2010)	Ploetz et al., 2003	N/A	No	N/A
ALGA					
<i>Cephaleuros virescens</i> Kunze	CO (Buriticá, 1999; Bernal and Diaz, 2006; Morales et al., 2005); US (Nelson, 2008a)	Bernal and Diaz, 2006; Farr and Rossman, 2011; Wellman, 1977	N/A	No	N/A

2.4.2. Pests not included in the pest list

Secondary pest. *Neosilba pendula* is highly unlikely to follow the pathway because it is a secondary pest that attacks hosts that have been damaged primary by fruit flies (McAlpine and Steyskal, 1982; White and Elson-Harris, 1992). Taking into account that ‘Hass’ avocado is not a host for fruit flies (7 CFR § 301 and 319, 2011), we conclude *N. pendula* is unlikely to be a pest of this commodity, and we did not list it above.

Doubtful presence in Colombia. There is only a single report of *Oligonychus thelytokus* Gutierrez as present in Colombia (CABI, 2005). However, the current CABI version does not include this report (CABI, 2010). Likewise, *Phenacoccus gossypii* is reported in Colombia (Figuroa 1977; Posada, 1989), but the reports are questionable (Kondo, 2001), and we found no others. Therefore, we did not list these species.

Planococcus lilacinus (Cockerell) [Syn: *Dactylopius crotonis* Green, *P. crotonis* Ferris] was reported in Colombia [Ochoa (1989) as cited by Kondo (2001)]. However, in recent, thorough avocado surveys in Colombia this pest was not collected (Kondo, 2011c). Thus, we did not include this pest on the list.

The following pests are cited by Morales et al. (2005) as present and associated with avocado in Colombia: *Akaropeltopsis* sp., *Conotrachelus perseae*, *Dothiorella aromatica*, *Oxyporus latemarginatus* (Syn.: *Poria latemarginata*), *Fomitella supina*, *Phyllosticta micropunta* (Syn.: *Phyllosticta perseae*), and *Rigidoporus ulmarius* (Syn.: *Fomes geotropas*). However, that pest list was an international literature compilation and not from direct field observations carried out in Colombia (Osorio, 2008). Therefore, since we found no other references that any of the above pests occur in Colombia, we did not list them.

Similarly, reports on presence in Colombia for the following pests were retracted by their authors: *Conotrachelus perseae* [Montoya (2004) as cited by Rios et al. (2005) and Morales et al. (2005)]; *C. aguacatae* (Carvajal, 2005); *Copturus aguacatae* (Rios et al., 2005; Waite and

Martinez, 2002), and *Frankliniella chamulae* (Rios et al., 2005). We found no other references that those pests occur in Colombia, so we did not list them above.

Copturus perseae was reported as present in Colombia (Waite and Martinez, 2002), but the author and ICA were unable to corroborate this (ICA, 2008; Waite, 2008). We found no other references indicating that this pest occurs in Colombia, so we did not list this pest above.

Doubtful host status. For the following organisms, we found insufficient evidence that avocado was a host.

- *Acanthocelides obvelatus* has only been intercepted on avocado five times in baggage (PestID, 2011).
- *Dysmicoccus neobrevipes* (Beardsley) has been intercepted on avocado (PestID, 2011), but *D. neobrevipes* is no longer associated with avocado (Ben-Dov et al., 2010; Granara, 2009; Martinez et al., 2006; Mau and Martin 2007). Wright (2011) corrected an old and single *D. neobrevipes* report associating it with *P. americana*.
- *Epitrix cucumeris* (Harris) is mainly a pest of the Solanaceaceae family (Velez, 1997). ICA (1986) was a single report relating this pest to avocado.
- *Gibberella fujikuroi* (anamorph = *Fusarium fujikuroi*) reportedly attacks avocado fruits (Holliday, 1980), but we found no additional evidence for that (Farr and Rossman, 2011).
- *Heilipus unifasciatus* (Fabricius) reportedly attacks fruits of *Theobroma cacao* (Bigger, 2009; Urueta, 1975b). Only a single, insufficient report relates *H. unifasciatus* to avocado (Saldarriaga, 1977).
- *Hypocrea lixii* (Anamorph: *Trichoderma harzianum* Rifai) has been reported on avocado (avocado Mill) by Farr et al. (2008), but we did not include it above because this fungus is endophytic and biological activities against phytopathogens has been demonstrated (Hakizimana et al., 2011).
- *Mycena citricolor* is a pathogen of coffee (Farr and Rossman, 2011), with only a single report of it infecting avocado fruit (Wellman, 1977).
- *Rhynchophorus palmarum* (Linnaeus) attacks plants of the Arecaceae family, damaging palm fruits (Howard, 2008; Velez, 1997). CABI (2010) is the only reference associating this pest with avocado as “other host.”

Doubtful presence in Colombia and host status. *Planococcus minor* (Syn: *P. pacificus*) was removed from the pest list for the following reasons. First, the evidence relating it to avocado is scarce (Ben-Dov, 2007), and it has been only intercepted on avocado twice in baggage (one time from the Philippines and once from Puerto Rico) (PestID, 2010). Second, although this pest has been listed in Colombia by Ben-Dov et al. (2007) and Kondo (2001), both base their data on Williams and Granara de Willink (1992), which lists only two specimens identified in 1952 and 1953 as *Planococcus pacificus* from samples of *Theobroma cacao* collected in two regions of Colombia and registered at the National History Museum of London. Third, since 1953, although *P. minor* has a wide host range, it has not been reported in any national databases or documents, or detected, or intercepted from Colombia by U.S. inspectors (PestID, 2011).

If more information becomes available in the future, the statuses of the aforementioned pests could change.

2.4.3. Discussion on listed pests

Pests not following the pathway. Quarantine pests listed that were not chosen for further analysis may be potentially detrimental to the agriculture or natural environment of the United States; however, a variety of reasons exist for not further analyzing these pests. Some of the pests are associated with plant parts other than commodity, such as leaves, stems, roots, bulbs, or inflorescences. Other pests are not expected to be associated with the commodity following harvest and processing because of their inherent mobility, large size, or disturbance by human activity.

Diaspididae. We did not further analyze the armored scales (Hemiptera: Diaspididae) identified in this risk assessment as quarantine pests likely to follow the pathway (*Aulacaspis tubercularis*, *Mycetaspis personata*, and *Pseudischnaspis acephala*), because armored scales are highly unlikely to establish via this pathway due to their very limited ability to disperse to new host plants (Miller et al., 1985; PERAL, 2007). Only a certain immature form of armored scales, the crawler stage, can self-disperse. Crawlers are highly unlikely to successfully disperse by walking from their natal host since they are not capable of rapid movement over bare soil or rough surfaces. They typically disperse by being blown from plant to plant in the wind. Additionally, their dispersal period is limited to approximately 24 hours, after which they start feeding, become firmly anchored to the host tissue, and lose their legs. Adult females have no wings or legs. Dispersal from fruit discarded into the environment is highly unlikely because of low wind speeds at ground level and low survival rate of crawlers on the ground or on decaying fruit or fruit peels.

Fruit flies. Recent research from different countries demonstrated that all fruit flies reported in the past as avocado pests (e.g., *Anastrepha fraterculus*, *Anastrepha obliqua*, *Anastrepha striata*, *Anastrepha serpentina*, and *Ceratitidis capitata*) (CABI, 2010; CABI and EPPO, 1997; Ebeling, 1959; Jiron et al., 1988; Liquido, et al., 1995; Norrbom and Kim, 1988; Uramoto et al., 2001; Waite and Martinez, 2002; White and Elson-Harris, 1992) are not viable in commercially produced and harvested green mature ‘Hass’ avocado, because it is a nonhost or limited host and therefore do not follow the pathway (7 CFR § 301, 319, 2011; Aluja et al., 2004; De Graff, 2009; Ovruski et al., 2003; Salles, 1999; SENASA and ProHass, 2010).

Pests not identified to species. Generally, based on standards by the International Plant Protection Convention (IPPC, 2009), we do not consider risk mitigation measures for organisms identified only to the genus level if the genus in question is reported in the continental United States. Often there are many species within a genus, and we cannot know if the unidentified species occurs in the continental United States and, consequently, whether it meets the definition of a quarantine pest for the continental United States. In this risk assessment, the preceding statement applies to organisms that follow the pathway. These are the arthropods *Gymnandrosoma* sp. and the pathogens *Aspergillus* sp., *Capnodium* sp., and *Phytophthora* sp. These genera are reported to occur in the continental United States (Brown and Baixeras, 2005; Farr and Rossman, 2011). Lack of specific identification may indicate the limits of current taxonomic knowledge or the life stage or quality of the specimen submitted for identification. Pest risk assessments focus on organisms for which biological information is available. Lack of specific identification does not rule out the possibility that a high-risk quarantine pest was intercepted. Conversely, the development of detailed assessments for known pests that inhabit a

variety of ecological niches, such as internal fruit feeders or foliage pests, allows effective mitigation measures to eliminate the known organisms as well as similar but incompletely identified organisms that inhabit the same niche. If pests identified to higher taxa are intercepted in the future, we may reevaluate their risk.

Pests not considered for further mitigation. The standard postharvest processing processes of brushing and washing to remove dust, large particles, and external pests (Step 4 in Appendix A), and culling to remove fruit with external pests and other problems (Step 5), are highly likely to remove the following external pests listed above: *Ceroplastes rubens*, *Lorryia formosa*, *Phyllocnistis perseafolia*, *Thrips palmi*, and *Vinsonia stellifera*.

Similarly, the fungus, *Albonectria rigidiuscula*, is highly unlikely to follow the pathway because of several reasons (see above), such as culling, but also because harvesting procedures state that only healthy orchards will be used to produce fruit for exportation (Step 2 in Appendix A), and infected trees are unlikely to be sourced.

2.5. Quarantine Pests Likely to Follow the Pathway

We analyzed the quarantine pests expected to follow the pathway (i.e., be included in commercial shipments of avocado ‘Hass’ avocado) (Table 4) in detail below [Steps 5-7 (PPQ, 2000)].

Table 4. Quarantine pests likely to follow the pathway and selected for further analysis.

Pest	Taxonomy
<i>Heilipus lauri</i>	Coleoptera: Curculionidae
<i>Heilipus trifasciatus</i>	Coleoptera: Curculionidae
<i>Stenoma catenifer</i>	Lepidoptera: Elasmobranchidae

2.6. Risk Assessment

2.6.1. Consequences of Introduction

Using our guidelines (PPQ, 2000), we assessed the Consequences of Introduction in five risk elements. Below, we summarized the values for the Consequences of Introduction for each pest (Table 5).

<i>Heilipus lauri</i> and <i>H. trifasciatus</i>	Risk ratings
Risk Element #1: Climate-Host Interaction	Medium (2)
<i>Heilipus lauri</i> and <i>H. trifasciatus</i> are found in tropical regions where avocados are grown (CABI, 2010; Castañeda-Vildózola et al., 2009). In the Western Hemisphere both species were identified in Colombia, Costa Rica, and Nicaragua (CABI, 2010; Cardenas and Posada, 2001; Castañeda et al., 2007, Castañeda-Vildózola et al., 2009; Maes and O'Brien, 1990; STRI, 2011).	
<i>Heilipus lauri</i> is present in Guatemala and Mexico, while <i>H. trifasciatus</i> is also	

<i>Heilipus lauri</i> and <i>H. trifasciatus</i>	Risk ratings
in Panama (Castañeda et al., 2007; Castañeda-Vildózola et al., 2009). These areas correspond to Plant Hardiness Zones 9-11 for United States (Magarey, 2008). Based on this evidence the Climate-Host Interaction is rated Medium .	
Risk Element #2: Host Range Both <i>Heilipus lauri</i> and <i>H. trifasciatus</i> attack avocado, but they only attack <i>Persea</i> species (CABI, 2010; Castañeda et al., 2007; Castañeda et al., 2009). <i>Heilipus lauri</i> also attacks <i>Persea schiedeana</i> . Thus, the rating for this risk element is Low .	Low (1)
Risk Element #3: Dispersal Potential Dispersal data for <i>H. trifasciatus</i> are based on information for the avocado weevil <i>H. lauri</i> . The life cycle of <i>H. lauri</i> lasts 164 days [Coria-Avalos (1999, cited by Peña, 2010)], producing two generations per year (Dorantes et al., 2006). The female of <i>H. lauri</i> deposits one to two eggs per fruit and an average of 36 eggs per month (Castaño, 1983; Peña et al., 2002). The small oval eggs are 1 mm long, incubate from 12 to 14 days, and go through five instars in a period of 54 to 63 days (immature stages may remain up to 90 days in fruit). They bore through the flesh of the fruit, forming a gallery that extends to the seed, which is usually destroyed. Furthermore, they produce secondary rotting of the flesh and the seed (Dorantes et al., 2006; Peña et al., 2002). Adults are sedentary and tend to remain in the foliage of the host tree, but can move between orchards (Dorantes et al., 2006; Peña et al., 2002). Larvae are internal and can be transported worldwide by human movement of fruits. Although <i>H. lauri</i> and <i>H. trifasciatus</i> have a sedentary nature, their long lifespan increases the likelihood of assisted movement and they are therefore given a High risk rating	High (3)
Risk Element #4: Economic Impact <i>Heilipus lauri</i> and <i>H. trifasciatus</i> destroy the flesh and seeds, and cause premature fruit drop (Peña et al., 2010). Harvested fruits attacked by <i>Heilipus</i> species do not enter commerce; thus, losses to the producer reach 100 percent (Lynce, 2007). Applications of insecticides for controlling these pests are ineffective after oviposition because the eggs and larvae are protected within the fruit (Lynce, 2007). Only adults can be controlled by sprays if detected during surveys (Teliz, 2000). <i>Heilipus lauri</i> and other <i>Heilipus</i> species are pests threatening avocado crops in Florida and cost the counties where it is established billions of dollars annually in control measures and crop damage (Peña, 1998). They would present a significant pest risk to the United States avocado crops if introduced, particularly in California and the southeastern States. Finally, <i>Heilipus lauri</i> is a regulated pest and is likely to trigger quarantine measures on avocados exported from the United States to other avocado-producing countries where this pest does not occur. The overall economic impact of the two pests is High .	High (3)
Risk Element #5: Environmental Impact <i>Heilipus lauri</i> and <i>H. trifasciatus</i> are monophagous pests and do not have association with endangered or threatened plants (USFWS, 2011). However, if these pests established, they are expected to initiate chemical or control as part	Medium (2)

<i>Heilipus lauri</i> and <i>H. trifasciatus</i>	Risk ratings
of eradication programs. The overall Environmental impacts of <i>H. trifasciatus</i> and <i>H. lauri</i> is Medium .	

<i>Stenoma catenifer</i>	Risk ratings
Risk Element #1: Climate-Host Interaction	Medium (2)

The avocado seed moth, *Stenoma catenifer*, is one of the main pests attacking avocado and other Lauraceae species in the Neotropical region; it has been found in Mexico (Acevedo, 1970) up to northern Argentina [Artigas, 1994, cited by Nava and Parra (2005)]. The main host of *S. catenifer* is avocado, but it does attack other Lauraceae plant species (CABI, 2011; Link and Link, 2008; Peredo et al., 1999). Avocado and *Cinnamomum camphora* are present in California, Florida, Texas, and other southwestern states (NRSC, 2011). Consequently, *S. catenifer* is likely to be established in Plant Hardiness Zones 9-11 (Magarey et al., 2008). Because Zone 11 is so small, it does not count toward the total. For this sub-element, we rated this risk **Medium**.

Risk Element #2: Host Range	Medium (2)
------------------------------------	------------

Stenoma catenifer feeds exclusively on fruits and seeds of the Lauraceae family (CABI, 2010; Hoddle, 2008). The species attacked are avocado as a major host with *Beilschmiedia* sp., *Chlorocardium rodiei*, and *P. schiedeana* as minor hosts (CABI, 2010; Peredo et al., 1999). *Nectandra megapotamica* and *Cinnamomum camphora* are reported as hosts in Brazil (Link and Link, 2008). The ‘Hass’ avocado seems to be the preferable host for the *S. catenifer* female’s oviposition (Hoddle, 2008). Therefore, the risk rating value for this element is **Medium**.

Risk Element #3: Dispersal Potential	High (3)
---	----------

Studies conducted under laboratory conditions in Brazil found that *S. catenifer* has 7.8 generations per year; and 5.1 generations during the production cycle of ‘Breda’ avocados (December-August) (Nava et al., 2005). At temperatures between 20 and 25°C (68 and 77°F), females can oviposit from 133 up to 318 eggs during their adult stage (Nava et al., 2005). At this temperature range, this pest can live from 12 to 18 days (Nava et al., 2005). Temperatures over 30°C (86°F) are detrimental to the development of *S. catenifer*, while at 18°C (64°F) the different biological stages exhibited high viability, indicating that lower temperatures are beneficial for its development (Nava et al., 2005).

After being released in an avocado orchard, adults only reached distances ranging from 3 to 12 meters during the day (Hoddle, 2008), but longer distances at night. Transportation of infested fruit is also an important means of movement for this pest. Infested avocados have an average of four larvae per fruit (Nava et al., 2006). Overall, then, we rated *S. catenifer* dispersal as High.

Risk Element #4: Economic Impact	High (3)
---	----------

Hohmann and Meneguim [(1993), cited by Ventura et al. (1999)] state that in Latin America, *Stenoma catenifer* is one of the most important pests of avocado,

<i>Stenoma catenifer</i>	Risk ratings
<p>causing the total production loss. The proportion of spoiled fruit has reached the 100 percent in Brazilian production avocado crops (Santos et al., 1996), 80 percent in Venezuelan production (Cervantes, 1999), and 100 percent in Ecuador (Sasscer, 1918 as cited by CABI, 2010).</p> <p>Most of the damage is caused by the larva, which feed inside the fruit, spoiling the seed as well as the soft parts. Fruits attacked by <i>S. catenifer</i> are characterized by white exudates, frass accumulation, and holes from larval entrance; infested fruit may be prematurely aborted (Hoddle, 2008). The losses caused by this pest push many farmers to abandon production areas (Nava et al., 2005). This pest decreases the product's value, increases in production costs, and local and international markets losses. Thus, the economic impact caused by avocado seed moth is rated High.</p>	
<p>Risk Element #5: Environmental Impact</p> <p><i>Stenoma catenifer</i> does not affect plant species listed as endangered or threatened (USFW, 2011). If the pest's establishment occurred, it would be necessary to set chemical and biological control programs (CABI, 2010, Hoddle, 2008). Based on this evidence, this element is rated with a High risk value.</p>	High (3)

Table 5. Risk ratings for Consequences of Introduction.

Pest	Risk Elements					Cumulative risk rating ^a
	Climate-host interaction	Host range	Dispersal potential	Econ. Impact	Environ. Impact	
<i>Heilipus lauri</i>	Med (2)	Low (1)	High (3)	High (3)	Med (2)	Medium (11)
<i>Heilipus trifasciatus</i>	Med (2)	Low (1)	High (3)	High (3)	Med (2)	Medium (11)
<i>Stenoma catenifer</i>	Med (2)	Med (2)	High (3)	High (3)	High (3)	High (13)

^a Low is 5-8 points, Medium is 9-12 points, and High is 13-15 points

2.6.2. Likelihood of Introduction

We rated each pest for the Likelihood of Introduction based on two separate components. First, we estimated the amount of commodity likely to be imported. Secondly, we estimated pest opportunity using five biological features. Details of the rating criteria are explained in PPQ (2000). We summarized our ratings and the overall value for the Likelihood of Introduction below (Table 7).

Quantity of Commodity Imported Annually. We assess import volumes in terms of the number of 40-foot-long sea shipping containers (which hold approximately 18,143 kg or 40,000 pounds) (FAS, 2008b). Colombia has 5,696 ha (14,075 acres) of grown commercial ‘Hass’ avocado in production, which is estimated to yield 59,238 tons (based on a yield of 10.4 tons per ha). Of this quantity, 3 percent is expected to be exported, or an approximate total of 1,777 tons (3,909,400 lbs), which is equivalent to 98 containers (Consejo Nacional del Aguacate, 2011a).

Thus, the projected initial volume of ‘Hass’ avocado fruit to be shipped from Colombia to the United States is estimated to be no more than 100 containers per year. Based on this evidence, the risk factor is rated as **Medium** for all pests. This volume could increase in forthcoming years because an additional 500 to 900 ha of ‘Hass’ avocados are expected to be planted in 2011 (Consejo Nacional del Aguacate, 2011a).

Survive Post-Harvest Treatment. Fruit at the post-harvest site (exclusionary screen is used) is brushed and washed, disinfected, culled, graded (color, size, weight, and health), packed, and stored (see Section 1.2).

- Coleoptera. *Heilipus lauri* and *H. trifasciatus* are internal feeders that are not likely to be affected by surface-cleansing post-harvest treatments such as brushing, washing, and culling, especially at the very early stages of infestation when damage indexes are not obvious. Immature stages may remain in the fruit up to 80 days (Peña et al., 2002). Based on this information, larvae have a **High** probability of surviving post-harvest treatment.
- Lepidoptera. *Stenoma catenifer* neonate larvae may escape detection during normal post-harvest procedures. However, the presence of later instars on fruit would probably be detected due to the presence of frass and visible feeding damage (holes, exudates, white dust) (Hoddle, 2008; Londoño, 2006; Quintero, 2006). All post-harvest practices are not demonstrated to eliminate this internal feeder. Consequently, we rated the likelihood of survival for this pest **High**.

Shipment Survival. Pallets of ‘Hass’ avocado are shipped from the packinghouses to airport or seaport facilities in refrigerated trucks (5-7°C and 85-90% RH) and will be shipped from Colombia to the United States on three- to six-hour non-stop flights or between three and five days by sea to Gulf and East coast ports of the United States (See Appendix A). We do not expect shipping duration and conditions to affect survival of internal pests present in the shipment (see Table 6).

- Coleoptera. The internal feeders are protected from adverse environmental conditions by fruit tissues. Short transit time and shipment conditions described are insufficient to reduce numbers of *Heilipus lauri* and *H. trifasciatus*. The high number of *Heilipus* spp. intercepted on avocado fruits supports this fact (PestID, 2011). Shipment survival is therefore rated **High**.
- Lepidoptera. High numbers of immature *S. catenifer* have been intercepted in avocados (PestID, 2011). We think that transportation conditions described would not reduce *S. catenifer* infestation levels. Thus, we rated *S. catenifer* **High** risk.

Table 6. Organisms intercepted at U.S. ports-of-entry on avocado or any commodity, and no. of individuals of different stages found (if applicable), from 1984 to 2011 on any commodity and from different countries (PestID, 2011).

Organism	Times intercepted	Individuals (no.)			
		Total	Immatures	Pupae	Adults
<i>Heilipus</i> spp.	72	111	110	1	0
<i>Stenoma catenifer</i>	458	651	638	7	5

Undetected at Port-of-Entry. Estimating the probability that these pests will not be detected at the port-of-entry involves consideration of the pest size, mobility, degree of concealment, and the symptoms manifestation in the commodity.

The Lepidoptera and Coleoptera are internal feeders. The later instars are large and feeding damage would be relatively easy to detect during normal inspection procedures such as destructive sampling. Interception data corroborates this (Table 6). However, earlier life stages of these pests are more likely to escape detection. Thus, these pests are rated **High**.

Imported or Moved to Area with Environmental Suitability for Survival. Avocados are accepted across U.S. society and the estimated consumption is four pounds per capita (Plattner, 2010). Main consumers in the United States are of Hispanic background (Carman et al., 2009). Avocados are produced in California and Florida (ERS, 2008). Only about 13 percent of imported avocados enter the United States in Florida or Southern California (Based on 2010-11 data; APHIS, 2013), and perhaps as much as 20 percent ends up in markets in those areas (not shown; AMS, 2013). This warrants a **High** risk rating for all pests.

Come into contact with host material suitable for reproduction.

Heilipus lauri and *H. trifasciatus* only feed on avocado, and therefore could only readily establish in Southern California or Florida, as discussed above. *Heilipus lauri* can complete its development within the fruit (Ebeling, 1950). Emerging adults can fly to find a host (Peña, 1998). Based on this information, we rated this sub-element **Medium** for *Heilipus lauri* and *H. trifasciatus*.

Avocado and *Cinnamomum camphora* are the only *Stenoma catenifer* hosts present in the United States (CABI, 2010; NRSC, 2011). This moth does not require pupation in soil, and adults are relatively strong nocturnal flyers (Hoddle, 2008). We rated them **Medium** risk.

Table 7. Risk ratings for Likelihood of Introduction

Pest	Risk sub-elements						Cumulative risk ratings ^a
	Quantity imported annually	Survive post-harvest treatment	Shipment survival	Undetected at Port-of-Entry	Moved to suitable habitat	Contact host material	
<i>Heilipus lauri</i>	Med (2)	High (3)	High (3)	High (3)	High (3)	Med (2)	High (16)
<i>Heilipus trifasciatus</i>	Med (2)	High (3)	High (3)	High (3)	High (3)	Med (2)	High (16)
<i>Stenoma catenifer</i>	Med (2)	High (3)	High (3)	High (3)	High (3)	Med (2)	High (15)

^a Low = 6-9, Medium = 10-14, High = 15-18 points.

2.7. Pest Risk Potential and Conclusion

The sums of the cumulative ratings for the Consequences of Introduction and the Likelihood of Introduction indicate that all species have High Pest Risk Potentials (Table 8). The PPQ Guidelines state that a High pest risk potential means that specific phytosanitary measures are strongly recommended and that port-of-entry inspection is not considered sufficient to provide phytosanitary security. The choice of appropriate measures to mitigate risk is undertaken as part of risk management and is not addressed in this document.

Table 8. Pest risk potentials.

Pest	Consequences of Introduction	Likelihood of Introduction	Pest Risk Potential^a
<i>Heilipus lauri</i>	Medium (11)	High (16)	High (27)
<i>Heilipus trifasciatus</i>	Medium (11)	High (16)	High (27)
<i>Stenoma catenifer</i>	High (13)	High (15)	High (28)

^a Low: 11 - 18 points, Medium: 19 - 26 points, High: 27 - 33 points

3. Authors, Contributors, and Reviewers

This document was originally developed (2008) at the Center for Phytosanitary Excellence (CEF), Bogota, Colombia and was later transferred to USDA-APHIS-CPHST-PERAL, Raleigh, NC, for extensive review and completion.

Authors

N. Arciniegas, Risk Analyst^a

Co-authors

A.C. Burgos, Risk Analyst^b

B. A. Orduz, Risk Analyst^b

Y. Martinez, Risk Analyst^b

J.D. Castillo, Risk Analyst^c

Reviewers

M. Zlotina, Entomologist^d

B. Randall-Schadel, Plant Pathologist^d

^a USDA-APHIS-CPHST-PERAL, Colombia

^b Colombian Agricultural Institute (ICA)

^c Center for Phytosanitary Excellence (USDA-APHIS-ICA-IICA)

^d USDA-APHIS-CPHST-PERAL, Raleigh

4. Literature Cited

7 CFR § 301, 319. 2011. Code of Federal Regulations, Title 7, Parts 301, 319 (7 CFR § 301, 319 - Foreign Quarantine Notices).

7 CFR § 319. 2011. U.S. Code of Federal Regulations, Title 7, Part 319 (7 CFR § 319 - Foreign Quarantine Notices).

7 CFR § 319.56–30. 2011. U.S. Code of Federal Regulations, Title 7, Part 319. 56-30 (7 CFR § 319.56-30 Foreign Quarantine Notices).

- 7 CFR 319.56-50. 2011. U.S. Code of Federal Regulations, Title 7, Part 319. 56-50 (7 CFR § 319.56-50 Foreign Quarantine Notices).
- Acevedo, E. J. 1970. Estudios sobre el barrenador del hueso y pulpa del aguacate *Stenomoma catenifer* Walsingham, 1912 (Lepidoptera: Stenomidae): I - Biología y hábitos; II - Descripción morfológica; III - Control químico bajo condiciones de campo. Tese de doutorado, Escuela Nacional de Agricultura, Colegio de Postgraduados, Chapingo, México, 163p. In: Nava, D. and Parra, J. 2005. Biología de *Stenomoma catenifer* Walsingham (Lepidoptera: Elachistidae) em Dieta Natural e Artificial e Estabelecimento de um Sistema de Criação. Neotropical Entomology 34(5):751-759
- Agronet. 2011. Red de Información y Comunicación Estratégica del Sector Agropecuario Agronet-Colombia. Ministerio de Agricultura y Desarrollo Rural (MADR). Last accessed January 12, 2011.
- Ahlmark, K., and G. Steck. 1997. A new U.S. record for a secondary fruit infester, *Neosilba batesi* (Curran) (Diptera: Lonchaeidae). Insecta mundi 11(2).
- Aluja, M., F. Diaz-Fleischer, and J. Arredondo. 2004. Nonhost status of commercial *Persea americana* 'Hass' to *Anastrepha ludens*, *Anastrepha obliqua*, *Anastrepha serpentina*, and *Anastrepha striata* (Diptera: Tephritidae) in Mexico. Journal of economic entomology 97(2):293 - 309.
- Álvarez de la Peña. A. J. 1981. El Aguacate. Ministerio de Agricultura. Publicaciones de Extensión Agraria. Madrid, España, pp. 20-142.
- Amarillo, A. 2000. Polillas Saturnidas (Lepidoptera: Saturniidae) de Colombia. Revista Biota Colombiana 1(2).
- Amarillo, A. 2008. Solicitud de información especies del genero Copaxa. Personal communication to A. Burgos on April 3, 2008., from Amarillo, A. Pontificia Universidad Javeriana.
- AMS. 2013. Fruit and Vegetable Market News: Terminal Market Report. United States Department of Agriculture, Agricultural Marketing Service (AMS). http://www.marketnews.usda.gov/portal/fv?paf_dm=full&reportConfig=true&paf_gear_id=1200002&dr=1&repType=wiz&startIndex=1&type=termPrice (Archived at PERAL)
- APHIS. 2010. Fruits and Vegetables Import Requirements (FAVIR). United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS). <https://epermits.aphis.usda.gov/manual/index.cfm?action=pubHome>. (Archived at PERAL).
- APHIS. 2011. PPQ280 (cargo shipments) Database. United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS). <https://mokcs14.aphis.usda.gov/aqas/login.jsp>. (Archived at PERAL)
- Arco-verde, M. F. 2002. Potencialidades e Usos do Cedro Doce (*Bombacopsis quinata*) no Estado de Roraima. Boa Vista: Embrapa Roraima, 2002. 14p. (Embrapa Roraima. Documentos, 10).
- Arevalo, E. 2011. Postcosecha de Aguacate 'Hass' en Colomba (under printing). Personal communication to Nancy Arciniegas. Pest Risk Anayst. CPHST. On May 4, 2011, from Emilio Arevalo. Director Técnico de Epidemiología y Vigilancia Fitosanitaria. Instituto Colombiano Agropecuario (ICA).
- Atehortúa de la Cuesta, M. 1975 Aguacates. Secretaría de Agricultura y Fomento. 76 p. Medellín (Colombia).
- Atkinson, T., and S. Peck. 1994. Annotated checklist of the bark and ambrosia beetles (Coleoptera: Platypodidae and Scolytidae) of tropical southern Florida. Florida Entomologist 77(3).
- Atkinson, T. 2011. Bark and Ambrosia Beetles. Atkinson, T. Last accessed August 10, 2011, <http://www.barkbeetles.info/index.php>.
- Australian Weeds Committee. 2011. Noxious Weed List for Australian States and Territories. in. Weeds Australia. Last accessed: December, 2011, [ww.weeds.org.au/docs/weednet6.pdf](http://www.weeds.org.au/docs/weednet6.pdf)
- Ayquipa-Aycho, G., R. Mendocilla-Bacilio, and S. Neyra. 2009. Insectos plaga, predadores y parasitoides en el cultivo de palto, *Persea americana*, en el Fundo San Miguel, Virú, La Libertad, Perú. REBIOL 29(1).
- Barber, H. S. 1912. Note on the avocado weevil (*Heilipus lauri* Boheman). Proceedings of the Entomological Society of Washington. XIV:181-183.

- Belloti, A., V. Arias, O. Vargas, and J. Pena. 2002. La Yuca en el Tercer Milenio: Sistemas Modernos de Producción Procesamiento, Utilización y Comercialización. Centro Internacional de Agricultura Tropical, Cali, Colombia. 586p
- Ben-Dov, Y. 1994. A systematic catalogue of the mealybugs of the world (Insecta: Homoptera: Coccoidea: Pseudococcidae and Putoidae) with data on geographical distribution, host plants, biology and economic importance (Department of Entomology, Agricultural Research Organization, The Volcani Center, Bet Dagan, Israel. British Library CIP data available. Printed in Great Britain by Atheneum Press, Newcastle upon Tyne). Published by Intercept Limited, P.O. Box 716 Andover, UK 635 pp.
- Ben-Dov, Y., D. R. Miller, G. A. P. Gibson, M. E. Gimpel, K. Veilleux, and V. German. 2007. ScaleNet. Last accessed January 14, 2008, <http://www.sel.barc.usda.gov/scalenet/scalenet.htm>.
- Ben-Dov, Y., D. R. Miller, G. A. P. Gibson, M. E. Gimpel, K. Veilleux, and V. German. 2010. ScaleNet. Last accessed March 11, 2011, <http://www.sel.barc.usda.gov/scalenet/scalenet.htm>.
- Bernal, J., and C. Diaz. 2006. Capitulo de Insectos - Londoño, M. Pages 119 -153 in J. Bernal and C. Diaz, (eds.). Tecnología para el cultivo de Aguacate. CORPOICA Centro de investigación, La Selva Rionegro, Antioquia.
- Bigger, M. 2009. A geographical distribution of Insects and mites associated with cocoa, derived from Literature published before 2010. in GlobalPestInfo, ed. NSF Center for Integrated Pest Management, North Carolina State University.
- Blinda F., and Joly L. 1991. Los bostrichidae (coleoptera) de Venezuela Boletín de Entomología Venezolana 6(2):83-133.
- Bolland, H. R., J. Gutierrez, and C. H. W. Flechtmann. 1998. World Catalogue of the Spider Mite Family (Acari: Tetranychidae). Brill, Leiden, The Netherlands. 392 pp.
- Bradbury, J. F. 1986. Guide to Plant Pathogenic Bacteria. CAB International Mycological Institute. Ferry Lane, Kew, Surrey, England. 332 pp.
- Brown, J. W., and J. Baixeras. 2005. Tortricidae: Lepidoptera. World Catalogue of Insects (2005). Apollo Books Aps., USA. 745 pp.
- Brown, J. W., and R. L. Brown. 2004. A new species of *Cryptaspasma* (Lepidoptera: Tortricidae: Olethreutinae) From Central America, The Caribbean, And Southeastern United States, With A Catalogue Of The World Fauna of Microcorsini. Proceedings Of The Entomological Society of Washington. 106: 288-297
http://www.ars.usda.gov/research/publications.htm?SEQ_NO_115=147162
- Buriticá, P. 1999. Directorio de Patógenos y Enfermedades de las Plantas de Importancia Económica en Colombia. Produmedios, Bogotá. 329 pp.
- Burks, C. S., and D. G. Brandl. 2004. Seasonal abundance of the navel orangeworm, *Amyelois transitella*, in figs and the effect of peripheral aerosol dispensers on sexual communication. Journal of Insect Science 4:40(40).
- Buss, E. 2006. Flight activity and relative abundance of phytophagous scarabs (Coleoptera: Scarabaeoidea) from two locations Florida. Florida Entomologist 89(1).
- CABI. 2010. Crop Protection Compendium Commonwealth Agricultural Bureau International (CABI), Wallingford, UK.
- CABI. 2011. Crop Protection Compendium Commonwealth Agricultural Bureau International (CABI), Wallingford, UK.
- CABI., and EPPO. 1997. Quarantine Pests for Europe. Second Edition. Data sheets on quarantine pests for the European Union and for the European and Mediterranean Plant Protection Organization. CAB International (CABI) and the European and Mediterranean Plant Protection Organization (EPPO), Wallingford, Oxon, UK.
- Calabrese, F. 1992. El Aguacate. Versión española de Javier Calatrava. Ediciones Mundi-Prensa Madrid-España (Copia del libro). 249 pp.

- Capinera, J. 1999. Banded Cucumber Beetle, *Diabrotica balteata* LeConte (Insecta: Coleoptera: Chrysomelidae). Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. 3pp.
- Cardenas M. R., and F. Posada. 2001. Los insectos y otros habitantes de cafetales y platanales. Centro de Investigación de Café (Cenicafe) “Pedro Uribe Mejia” Chinchina Caldas-Colombia. 250pp.
- Carman, H., L. Li, and R. J. Sexton. 2009. An Economic Evaluation of the Hass Avocado Promotion Order’s First Five Years. University of California. Agriculture and Natural Resources, Davis, CA. 40 pp.
- Carvajal, J. 2005 Manual practico para el cultivo del aguacate. Pages 27-30. Servicio Nacional de aprendizaje (SENA) Antioquia, Centro Multisectorial de Oriente.
- Carvajal, J. G. 2007. Personal communication to Boris Orduz. Center for Phytosanitary Excellence on June 5, 2007., from Juan Guillermo Carvajal C.
- Castafto, O., and Henao. M.V. 1997. Evaluación de cinco insecticidas para el control de Thrips en cultivos de maracuyá (*Passiflora edulis* Degener) var. *flavicarpa* Fitotecnia 004:2.
- Castañeda-Vildózola, A., O. Angel-Coronel, J. G. Cruz-Castillo, and J. Valdes-Carrasco. 2009. *Persea schiedeana* (Lauraceae), Nuevo Hospedero de *Heilipus lauri* Boheman (Coleoptera: Curculionidae) en Veracruz, México. Neotropical Entomology 38(6):871-872.
- Castañeda-Vildózola, A., J. Valdez, A. Equihua, H. Gonzalez, J. Romero, Solis J. E., and S. Ramirez. 2007. Genitalia de Tres Especies de Heilipus Germar (Coleoptera: Curculionidae) que Dañan Frutos de Aguacate (*Persea americana* Mill) en México y Costa Rica. Neotropical Entomology 36 36(6):914-918
- Castaño, O. 1983. Manejo de problemas entomológicos en el cultivo del aguacate. En curso sobre el cultivo de cítricos y aguacates. (Copia parcial). Universidad de Caldas. , Manizales-Colombia.
- Castrillon, A., and C. Urrea. 2000. Aspectos epidemiológicos sobre el secamiento de los cítricos (*Ceratocystis fimbriata* Ellis & Halsted and Hunt) en tres variedades comerciales. Revista “Fitopatología Colombiana 24:15-20.
- Cervantes, L., Journal of Natural, and History, 531-542. 1999. The stenomatine moth, *Stenoma catenifer* Walsingham: a pre-dispersal seed predator of Greenheart (*Chlorocardium rodiei* (Schomb.) Rohwer, Richter & van der Werff) in Guyana. Journal of Natural History 33(4):531-542.
- Cherry, R. 1980. Host Plant preference of the whitefly, *Aleurodicus dispersus*. Florida Entomologist 63(2).
- Cole L., and A. Jackman. 1997. Insects in Vegetables. Texas Agricultural Extension Service. Last accessed March 2, 2004, <http://entowww.tamu.edu/extension/bulletins/b-1273.htm>.
- Consejo Nacional del Aguacate. 2011a. Poscosecha de Aguacate Hass en Colombia. Por: Andres Mejia . Secretario Tecnico Consejo Nacional del Aguacate. Cadena del Aguacate. Ministerio de Agricultura y Desarrollo Rural (MADR)
- Consejo Nacional del Aguacate. 2011b. Aguacate Hass en Colombia. Por: Andres Mejia. Secretario Tecnico Consejo Nacional del Aguacate. Cadena del Aguacate. Ministerio de Agricultura y Desarrollo Rural (MADR).
- Consejo Nacional del Aguacate. 2011c. Query on ‘Hass’ avocado transportation Personal communication to Nancy Arciniegas. Pest Risk Analyst. CPHST. From Andres Mejia. Secretario Técnico Consejo Nacional del Aguacate.
- Constantino, R. 2001. On-line catalog of the living termites of the new world Departamento de Zoologia. Universidade de Brasília. Last accessed June 21, 2007, <http://www.unb.br/ib/zoo/docente/constant/catal/catal.htm>.
- Córdova, L. 2011. *Membracis mexicana*. Biodiversidadvirtual.org. Last accessed August 29, 2011, <http://www.biodiversidadvirtual.org/>
- Coria-Ávalos, V. M. 1999. Ciclo de vida, fluctuación poblacional y control del barrenador de la semilla del aguacate (*Conotrachelus perseae* Barber, *C. aguacatae* B.) (Coleoptera: Curculionidae) en Ziracuaretiro, Michoacan, México. Revista Chapingo Serie Horticultura 5:313-318.

- CPHST. 2008. Biological and Taxonomic Support (BATS) Database. Center for Plant Health Science and Technology (CPHST), Plant Epidemiology and Risk Analysis Laboratory. <https://www.peral.org/CPHSTindex.cfm?CFID=928795&CFTOKEN=45278576>. (Archived at PERAL).
- Crous, P. W. 2002. Taxonomy and pathology of *Cylindrocladium* (*Calonectria*) and allied genera: 1-278 in: V. Robert, G. Stegehuis and J. Stalpers. 2005. The MycoBank engine and related databases. <http://www.mycobank.org>.
- Crous, P. W., C. L. Schoch, K. D. Hyde, A. R. Wood, C. Gueidan, G. S. de Hoog, and J. Z. Groenewald. 2009. Phylogenetic lineages in the Capnodiales. *Studies in Mycology* 64:17-47.
- Darvas, J. M. 1982. Etiology and Control of Some Fruit Diseases of Avocado (*Persea americana* Mill.) at Westfalia Estate, University of Pretoria, Pretoria, South Africa. Ph. D. Tesis. 136 pp.
- Davis, D.R. and D. Wagner. 2011. Biology and systematics of the New World *Phyllocnistis* Zeller leafminers of the avocado genus *Persea* (Lepidoptera, Gracillariidae). *ZooKeys* 97: 39–73.
- De Graaf, J. 2009. Host Status of Avocado ('Hass') to *Ceratitis capitata*, *Ceratitis rosa*, and *Ceratitis cosyra* (Diptera: Tephritidae) in South Africa. *Journal of Economic Entomology* 102(4):1448-1459.
- Dorantes, L., L. Parada, and A. Ortiz. 2006. Chapter 3. Avocado Post-Harvest Operation Organization: Food and Agriculture Organization of the United Nations, FAO, and Rome, Italy Edited by AGST/FAO: Danilo Mejía, PhD, FAO (Technical), Emanuela Parrucci http://www.fao.org/inpho/content/compend/textch30/ch30_03.htm.
- Duran I., Mesa N., and E. Estrada. 1999. Ciclo de vida de *Thrips palmi* (Thysanoptera: Thripidae) y registro de hospedantes en el Valle del Cauca. 9. *Revista Colombiana de Entomología* 25(3-4):109-120.
- Ebeling, W. 1950. *Subtropical Entomology*. Lithotype Process Co., San Francisco. 747 pp.
- Ebeling, W. 1959. *Subtropical Fruit Pests*. University of California Division of Agricultural Sciences. 320 pp.
- Echeverri, F., C. Loaiza, and M. Cano. 2004. Reconocimiento e identificación de trips fitófagos (Thysanoptera: Thripidae) y depredadores (Thysanoptera: Phlaeothripidae) asociados a cultivos comerciales de aguacate *Persea* spp. en los Departamentos de Caldas y Risaralda (Colombia). *Revista Facultad Agronomía Universidad Nacional Medellín* 57(1): 2177-2188.
- ecoport. 2008. *Persea americana*. As Host with Co-Actor as Pest. The University of Florida (UF), the Food and Agriculture Organization of the United Nations (FAO), the National Museum of Natural History (NMNH) of the Smithsonian Institution (SI). Last accessed August 26, 2008, <http://ecoport.org/ep?Plant=1659>.
- EPPO. 2006. Quarantine alert list. *Aleurodicus dispersus*. European Plant Protection Organization (EPPO). (Archived at PERAL). Last accessed November 22, 2011,
- ERS. 2008. Fruit and Tree Nut Yearbook Spreadsheet Files. Economic Research Service (ERS). United States Department of Agriculture. Last accessed January 11, 2011,
- ERS. 2009. Fruit and Tree Nut Yearbook Spreadsheet Files. Economic Research Service (ERS). United States Department of Agriculture. Last accessed January 11, 2011,
- Euzéby. 2011. List of Prokaryotic names with Standing in Nomenclature. Formerly List of Bacterial names with Standing in Nomenclature (LBSN). Formerly List of Bacterial names with Standing in Nomenclature (LBSN). <http://www.bacterio.cict.fr>.
- Evans, A., and A. Smith. 2007. An electronic checklist of the new world chafers (Coleoptera: Scarabaeidae: Melolonthinae) Version 2
- Evans, G. 2007. Host plant list of the whiteflies (Aleyrodidae) of the world United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS). Last accessed October, 2011, <http://www.sel.barc.usda.gov:591/1WF/WhiteflyHost.pdf>.
- Evans, G. 2008. The whiteflies (Hemiptera: Aleyrodidae) of the world and Their Host Plants and Natural Enemies. United States Department of Agriculture (USDA), Animal and Plant Inspection Service

- (APHIS). Last accessed November, 2011, <http://www.sel.barc.usda.gov:8080/1WF/World-Whitefly-Catalog.pdf>.
- FAO. 2010. AGRIS (International Information System for the Agricultural Sciences and Technology), FAO (Food and Agriculture Organization). Last accessed March 09, 2010, <http://www.fao.org/agris>.
- Farr, D. F., Rossman, A.Y., Palm, M.E., and E.B. McCray. 2008. Fungal Databases, Systematic Botany & Mycology Laboratory, ARS, USDA. Last accessed January, 2008, <http://nt.ars-grin.gov/fungaldatabases/>.
- Farr, D. F., and Rossman. A. Y. 2011. Fungus-Host Distribution Database. Systematic Botany and Mycology Laboratory, ARS, USDA. . Last accessed May, 2011, http://nt.ars-grin.gov/fungaldatabases/fungushost/new_frameFungusHostReport.cfm. (Archived at PERAL).
- FAS. 2008a. Avocado Update. Market News. United State Department of Agriculture (USDA)-Foreign Agricultural Services (FAS). Last accessed January 11, 2011 (Archived at PERAL).
- FAS. 2008b. Export Plan Glossary. United State Department of Agriculture (USDA) - Foreign Agricultural Services (FAS). Last accessed May 19 of 2008, http://www.fas.usda.gov/agexport/export_plan/glossary.htm.
- Fazzio, J., A. Lofego, and Ramadan. A. 2005. Ácaros plantícolas (Acari) da “Estação ecológica do noroeste paulista”, Estado de São Paulo, Brasil. *Biota Neotropica* 5(1):1-14.
- Ferris, H. 2010. Nemaplex Search Engine for the Host Status of Plants to Nematodes. Nemaplex, 2010. Nematode Management. University of California, Department of Nematology. Last accessed March 27, 2011, <http://plpnemweb.ucdavis.edu/Nemaplex/Nemaplex2010/NemaplexPlantQuery.aspx>.
- Ferro, M. L. 2006. The Bark and *Ambrosia* Beetles (Curculionidae: Scolytinae) of Louisiana: An Interactive Web-based Key. Last accessed April 11, 2008, <http://entomology.lsu.edu/lam/scolytinae/key/Scolytinae%20of%20Louisiana/Media/Html/Hypothemuseruditus.html>.
- Figuerola, A. 1977. Insectos y acarinos de Colombia. Universidad Nacional de Colombia, Bogotá. 685pp.
- FLEPPC. 2009. Florida Exotic Pest Plant Council's 2009. List of Invasive Plant Species. Florida Exotic Pest Plant Council (FLEPPC). 4 pp.
- Foldi, I., and G. Watson. 2001. A new pest scale insect on avocado trees in Colombia, *Laurencella colombiana* sp. n. (Hemiptera: Coccoidea: Margarodidae). *Annales de la Société Entomologique de France* 37: 367-374.
- Foot, R., F. Blanc, and A. Norrbom. 1993. Handbook of the Fruit Flies (Diptera: Tephritidae) of America North of Mexico. Cornell University. 497p.
- Forest Service. 2010. Pacific Island Ecosystems at Risk (PIER): Plant Threats to Pacific Ecosystems. . United States Department of Agriculture (USDA). Last accessed October 22, 2010, <http://www.hear.org/Pier/>.
- French, B. R. 1996 Food plants of Papua New Guinea. A compendium. Pages 395-396 in B. R. French, ed. French, B. R., Sheffield, Tasmania.
- Freytag, P. H., and M. J. Sharkey. 2002. A preliminary list of the leafhoppers (Homoptera: Cicadellidae) of Colombia. *Biota Colombiana* 3 (2):235 - 283.
- Gagné R., Posada F., and Z. Gil. 2004. A new species of *Bruggmanniella* (Diptera: Cecidomyiidae) aborting young fruit of avocado, *Persea americana* (Lauraceae) in Colombia and Costa Rica *Proceedings of the Entomological Society of Washington*: 106, (3):547-553.
- Gallego, F., and Vélez. R. 1992. Lista de insectos que afectan los principales cultivos, plantas forestales, animales domésticos y al hombre en Colombia. Universidad Nacional de Colombia. Facultad de Ciencias. Departamento de Biología. Área de Entomología. Seccional Medellín. Medellín. 181pp.
- Gil, Z. N., Posada F., M. Pérez, and Cárdenas R. 2007 Registro y notas bionómicas de una nueva plaga del aguacate *Laurencella colombiana* (Hemiptera: Margarodidae) *Revista U.D.C.A Actualidad y Divulgación Científica* 10(2):43-50.

- Glenn, H., J. E. Peña, R. M. Baranowski, and R. Duncan. 2003. Lepidopterous pests of Florida avocado: Biodynamics, mortality factors and control. Proceedings V World Avocado Congress (Actas V Congreso Mundial del Aguacate).
- González-Herrera, A. 2003. Artrópodos asociados al aguacate (*Persea americana*). En Costa Rica. Pages 449-454. Proceedings V World Avocado Congress (Actas V Congreso Mundial del Aguacate) 2003.
- González-Herrera, A. 2011. Query on *Heilipus elegans* Personal communication to N. Arciniegas on April 26, 2011, from González-Herrera, Allan., (Lab. Entomología. Escuela Ciencias Agrarias. Universidad Nacional Costa Rica).
- Granara de Willink, M. C. 2009. *Dysmicoccus* de la Región Neotropical (Hemiptera: Pseudococcidae). Revista de la Sociedad Entomológica de Argentina 68(1-2):11-95.
- Guerrero J., and A. Bellotti. 1980. Contribución al conocimiento de algunos ácaros fitófagos encontrados en el cultivo de la yuca *Manihot esculenta* Crantz, en Colombia. En. Revista Colombiana de Entomología Vol. 6 Nos 3 -4, p.85-98.
- Gunn, C. R., and C. A. Ritchie. 1988. Identification of disseminules listed in the Federal Noxious Weed Act. USDA-ARS. Technical Bulletin (1719). 311pp.
- Haac, R. A. 2006. Exotic bark- and wood-boring Coleoptera in the United States: recent establishments and interceptions. Canadian Journal for Research 36:269-288.
- Hakizimana, J. D., M. Gryzenhout, T. A. Coutinho, and N. van den Berg. 2011. Endophytic diversity in *Persea americana* (avocado) trees and their ability to display biocontrol activity against *Phytophthora cinnamomi*. Pages 10. World avocado Congress 2011.
- Hall, D., A. Roda, S. L. Lapointe, and K. Hibbard. 2008. Phenology of *Maconellicoccus hirsutus* (Hemiptera: Psudococcidae) in Florida based on attraction of adult males to pheromone traps. Florida Entomologist 91(2).
- Hamon, A., and M. Williams. 1984. The soft scale insects of Florida (Homoptera: Coccoidea: Coccidae). In: Arthropods of Florida and neighboring land areas. Florida Department of Agriculture and consumer services. Gainesville, Florida. 11:194.
- Hill, D. S. 1983. Agricultural insect pests of the tropics and their control. Cambridge University Press, Cambridge, U.S.A. 746pp.
- Hoddle, M. 2008. The Avocado Seed Moth, *Stenoma catenifer* Walsingham (Lepidoptera: Elachistidae). Department of Entomology, University of California, Riverside. . Last accessed May 28, 2008, <http://www.biocontrol.ucr.edu/Stenoma/Stenoma.html>.
- Hoddle, M. S., and C. D. Hoddle. 2008. Lepidoptera and Associated Parasitoids Attacking Hass and Non-Hass Avocados in Guatemala. Horticultural Entomology 101(4):1310-1316.
- Hoddle, M. 2006. *Neohydatothrips burungae* (Thysanoptera: Thripidae) Phenology & Survey New Project: Year 1 of 1 Proceedings of the California Avocado CO Avocado library RA.enl Page 7 Research Symposium, November 4, 2006. University of California, Riverside. Sponsored by the California Avocado Commission. Pages 12-15. Department of Entomology, University of California, Riverside.
- Hoddle, M. 2007. *Neohydatothrips burungae*. Phenology & Survey .Mark Production Research Report. California Avocado Commission Pests and Diseases, Riverside, CA. 4 pp.
- Hoddle, M. S., J. G. Millara, C. D. Hoddle, Y. Zoua, J. S. McElfresh, and S. M. Lescha. 2011. Field optimization of the sex pheromone of *Stenoma catenifer* (Lepidoptera: Elachistidae): evaluation of lure types, trap height, male flight distances, and number of traps needed per avocado orchard for detection, M.S. Hoddle, et al., Bulletin of Entomological Research 101: 145-152.
- Hodges, G., and G. Evans. 2005. An identification guide to the whiteflies (Hemiptera: Aleyrodidae) of the southeastern United States. Florida Entomologist 88(4).
- Hofshi, R. 2005. Perú - avocado industry in the desert. California Avocado Commission. Last accessed June 4, 2007, http://www.avocado.org/growers/pages/growers_605.php.
- Holliday, P. 1980. Fungus Diseases of Tropical crops, Common Wealth Mycological Institute, Kew Cambridge. University Press. 607 pp.

- Holm, L. G., J. Doll, E. Holm, J. V. Pancho, and H. J. 1997. *World Weeds: Natural Histories and Distributions*. John Wiley and Sons, New York. 1129 pp.
- Holm, L. G., J. V. Pancho, J. P. Herberger, and P. D.L. 1991a. *A Geographical Atlas of World Weeds*. John Wiley and Sons, New York. 391 pp.
- Holm, L. G., D. L. Plucknett, J. V. Pancho, and H. J.P. 1991b. *The World's Worst Weeds: distribution and biology*. Univ. of Hawaii Press, Honolulu. 608 pp.
- Howard, F. 2008. *Rhynchophorus palmarum*. Personal communication to Aura Burgos. Center for Phytosanitary Excellence. on April 14, 2008, from F. W. Howard, Ph.D. Associate Professor of Entomology. University of Florida, IFAS.
- Hoyos G, and J. Giraldo L. 1984. Reconocimiento de los insectos barrenadores del fruto en el aguacate (*Persea americana*, Mill) y evaluación económica de su daño, en huertos de los departamentos de Caldas y Risaralda. Universidad de Caldas, Manizales (Colombia). Facultad de Agronomía. Tesis (Ing. Agrónomo). Manizales (Colombia).
- ICA. 2005. Initiating event letter. Instituto Colombiano Agropecuario (ICA). Letter.007028. in Ministerio de Agricultura y Desarrollo Rural (MADR).
- ICA. 1978. Notas y noticias entomológicas. Programa de Entomología. Regional No.1 Cundinamarca y Boyacá. Instituto Colombiano Agropecuario (ICA).
- ICA. 2008. Personal communication to D. Shehrezad regarding occurrence and phytosanitary status in Colombia of certain pests of avocado. Letter dated September 19, 2008 on file with PERAL Library, Raleigh, NC (USDA-APHIS-PPQ-CPHST).
- ICA. 1982. Notas y noticias entomológicas. Programa de Entomología. Regional No.1 Cundinamarca y Boyacá. Instituto Colombiano Agropecuario (ICA).
- ICA. 1980. Notas y noticias entomológicas. Programa de Entomología. Regional No.1 Cundinamarca y Boyacá. Instituto Colombiano Agropecuario (ICA).
- ICA. 1986. Notas y noticias entomológicas. Programa de Entomología. Regional No.1 Cundinamarca y Boyacá. Instituto Colombiano Agropecuario (ICA).
- ICA. 1985. Notas y noticias entomológicas. Programa de Entomología. Regional No.1 Cundinamarca y Boyacá. Instituto Colombiano Agropecuario (ICA).
- ICA. 2010. Situación actual de la cochinilla rosada del hibisco *Maconellicoccus hirsutus* Green. (Homoptera: Pseudococcidae) en Colombia. Boletín Epidemiológico ICA. Instituto Colombiano Agropecuario (ICA).
- ICA 2012. Situación actual de la cochinilla rosada del hibisco *Maconellicoccus hirsutus* Green. (Homoptera: Pseudococcidae) en Colombia. Boletín Epidemiológico ICA. Instituto Colombiano Agropecuario (ICA). Febrero de 2012.
- ICONTEC. 2003. Aguacate Variedades Mejoradas. Norma Técnica. NTC 5209. ICONTEC, Bogotá. Instituto Colombiano de Normas Técnicas (ICONTEC)
- IPPC. 2009. International Standards for Phytosanitary Measures 1 to 29. 2009 Edition. Food and Agriculture Organization, International Plant Protection Organization (IPPC). 434 pp.
- ISSG. 2010. Invasive Species Database. Invasive Species Specialist Group (ISSG). Last accessed <http://www.issg.org/database/welcome/>.
- Janzen, D. H., and W. Hallwachs. 2005. Dynamic database for an inventory of the macrocaterpillar fauna, and its food plants and parasitoids, of the Area de Conservación Guanacaste (ACG), northwestern Costa Rica. Last accessed: August 21, 2008, <http://janzen.sas.upenn.edu/Wadults/searchfood.lasso> .
- Jeppson, L. R., H. H. Keifer, and B. E.W. 1975. *Mites injurious to economic plants*. University of California Press. London, England. 614 p.
- Jiron, L. F., J. Soto-Manitú, and A. L. Norrbom. 1988. A preliminary list of the fruit flies of the genus *Anastrepha* (Diptera: Tephritidae) in Costa Rica. *Florida Entomologist* 71(2):130-137.
- Johansen, R., A. Mojica-Guzmán, and G. Ascención-Betanzos. 1999. Introducción al conocimiento de los insectos tisanopteros mexicanos, en el aguacatero (*Persea americana* Miller) *Revista Chapingo Serie Horticultura* 5: 279-285.

- Jurado, C., and B. Sañudo. 1988. Manejo de problemas Fitopatologicos del frijol en el Valle de Sibundoy, Putumayo in Asociacion Colombiana de Fitopatología y ciencias afines (ASCOLFI). (ed.). IX Congreso Nacional de Fitopatología y Ciencias Afines - ASCOLFI, San Juan de Pasto Colombia.
- Koch, F. 1983. Avocado Grower's Handbook (Chapter 2). Last accessed May 8, 2008, <http://www.avocadosource.com/>.
- Kondo, T. 2001. Las Cochinillas de Colombia (Hemiptera: Coccoidea). *Biota Colombiana* 2(1):31-48.
- Kondo, T. 2008. *Ceroplastes rubens* Maskell (Hemiptera: Coccidae), a new coccid record for Colombia. *Boletín del Museo de Entomología de la Universidad del Valle* 9(1):66-68.
- Kondo, T. 2010. Description of a new coccid (Hemiptera, Coccidae) on avocado (*Persea americana* Mill.) from Colombia, South America. *ZooKeys* 42:37-45.
- Kondo, T. 2001. Las Cochinillas de Colombia (Hemiptera: Coccoidea). *Biota Colombiana* 2(1):31-48.
- Kondo, D. T. 2011a. Query on *Ceroplastes rubens*. Personal communication to N. Arciniegas on October 13, 2011, from Damian T. Kondo. Corpoica. Entomology Laboratory. CORPOICA, Palmira, Colombia.
- Kondo, D. T. 2011b. Query on *Nipaeococcus jonmartini*. Personal communication to N. Arciniegas on August 30, 2011, from Damian T. Kondo. Corpoica. Entomology Laboratory. CORPOICA, Palmira, Colombia.
- Kondo, D. T. 2011c. Query on *Planococcus lilacinus*. Personal communication to N. Arciniegas on September 23, 2011, from Damian T. Kondo. Corpoica. Entomology Laboratory. CORPOICA, Palmira, Colombia.
- Kondo, T., A. A. Ramos, and E. V. Vergara. 2008. Updated list of mealybugs and Putoids from Colombia (Hemiptera: Pseudococcidae and Putoidae). *Boletín del Museo de Entomología de la Universidad del Valle* 9(1):29-53.
- Kuenen, L. P. S., and J. P. Siegel. 2010. Protracted Emergence of Overwintering *Amyelois transitella* (Lepidoptera: Pyralidae) from Pistachios and Almonds in California. *Environmental Entomology* 39(4):1059-1067.
- Link, D., and F. M. Link. 2008. Identificação de Plantas Hospedeiras da Broca do Abacate, *Stenomacra catenifer* Walsingham (Lepidoptera: Elachistidae) no Rio Grande do Sul. *Neotropical Entomology* 37(3):342-344.
- Liquido, N., H. J. Chan, and G. and McQuate. 1995. Hawaiian Tephritid fruit flies (Diptera): Integrity of the infestation-free quarantine procedure for “Sharwil” avocado. *Journal of Economical Entomology* 88(1):85-96.
- Londoño, M. 2006. Cosecha y manejo Poscosecha. In: Bernal, J. and Díaz, C. Tecnología para el cultivo del aguacate. Manual técnico 5. Corpoica, centro de investigación la Selva.
- López, J. 2002. Semilla vegetativa de yuca en: Ospina, B. y Ceballos, H. 2002. La Yuca en el Tercer Milenio: Sistemas Modernos de Producción Procesamiento, Utilización y Comercialización. Centro Internacional de Agricultura Tropical, Cali, Colombia. 586p.
- Lynce, D. 2007. Manual metodológico para el establecimiento de un sistema productivo de aguacate en Colombia. Tesis de grado. Universidad de Caldas, Facultad de ciencias agropecuarias. 104p.
- Madrigal, A. 1986. Inventario de insectos dañinos a la reforestación en los Departamentos de Cauca y Valle. *Miscelanea Sociedad Colombiana de Entomología* 6:9-25.
- Madrigal, A. 2002. Insectos forestales en Colombia. Biología, hábitos, ecología y manejo. In L. F. Calderón, (ed.). Editorial Marín Vieco Ltda. 848p.
- Maes, J.-M., and C. Godoy. 1993. Catalogo de los Cicadellidae (Homoptera) de Nicaragua. *Revista Nicaraguense de Entomología* 24:5-34.
- Maes, J.-M., and C. W. O'Brien. 1990. Lista anotada de los Curculionidae (Coleóptera) de Nicaragua. *Revista Nicaraguense de Entomología* 12:1-78.
- Maes, J.-M., C. Godoy, and H. Strumpel. 2011. Familia Membracidae. BIO-NICA. Last accessed October 11, 2011, <http://www.bio-nica.info/Ento/Homop/Membracidae/Membracis%20mexicana.htm>.
- Magarey, R. D., D. M. Borchert, and J. W. Schlegel. 2008. Global Plant Hardiness Zones for Phytosanitary Risk Analysis. *Scientia Agricola (Piracicaba, Brazil)* 65:54-59.

- Manaaki Whenua. 2008. NZ fungi database Landcare Research. Last accessed March 14, 2004 (Archived at PERAL), <http://nzfungi.landcareresearch.co.nz>.
- Martin, J. L., and R. F. L. Mau. 2007. *Abgrallaspis cyanophylli* (Signoret). EXTension ENTOMology & UH-CTAHR Integrated Pest Management Program University of Hawaii, College of Tropical Agriculture and Human Resources, and Hawaii Department of Agriculture. http://www.extento.hawaii.edu/kbase/crop/type/a_cyanop.htm.
- Martin, J. L., R. F. L. Mau, and J. M. Diez. 2007. *Dysmicoccus neobrevipes*. EXTension ENTOMology & UH-CTAHR Integrated Pest Management Program University of Hawaii, College of Tropical Agriculture and Human Resources, and Hawaii Department of Agriculture. http://www.extento.hawaii.edu/kbase/crop/type/d_neobre.htm.
- Martínez, C. 2000. Escarabajos longicornios (Coleoptera: Cerambycidae) de Colombia. *Biota Colombiana* 1(1):76-105.
- Martínez, M. d. I. A., M. Surís, and E. Blanco. 2006. Fauna de chinches harinosas (Hemiptera: Coccoidea) asociada a plantas de interés: II. Árboles frutales. *Revista Protección Vegetal* 21 (2):109 -113.
- Mau, R., and S. Lee. 2007. *Bemisia argentifolii*. EXTension ENTOMology & UH-CTAHR Integrated Pest Management Program University of Hawaii, College of Tropical Agriculture and Human Resources, and Hawaii Department of Agriculture. Last accessed November 22, 2007 (Archived at PERAL), http://www.extento.hawaii.edu/Kbase/crop/type/b_argent.htm.
- Mau, R., and J. Martin. 2007. *Empoasca stevensi* Young. EXTension ENTOMology & UH-CTAHR Integrated Pest Management Program University of Hawaii, College of Tropical Agriculture and Human Resources, and Hawaii Department of Agriculture. Last accessed May 10, 2011 (Archived at PERAL), http://www.extento.hawaii.edu/kbase/crop/type/e_steven.htm.
- McAlpine, J. F., and G. C. Steyskal. 1982. A revision of *Neosilba* McAlpine with a key to the world genera of Lonchaeidae (Diptera). *Canadian Entomologist* 114:105-137.
- Mead, F. 1994. Entomology Section. TRI-ODOLOGY 33(5). Last accessed April 4, 2007 (Archived at PERAL), <http://www.doacs.state.fl.us/pi/enpp/94-9&10all.htm>
- Mead, F. W. 1963. A Psyllid, *Trioza magnoliae* (ashmead) (Homoptera: Psyllidae). *Entomology circular*.No.15. Florida Department of Agriculture. Division of plant industry. Last accessed April 4, 2007. <http://www.doacs.state.fl.us/pi/enpp/ento/entocirc-no.htm>
- Mead, F. W. 2004. Thorn Bug, *Umbonia crassicornis* (Amyot and Serville) (Insecta: Hemiptera: Membracidae) Mead, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL, Last accessed October 15, 2011 (Archived at PERAL), edis.ifas.ufl.edu/pdf/IN/IN33200.pdf
- Meade, B., K. Baldwin, and L. Kalvin. 2010. Peru: An Emerging Exporter of Fruits and Vegetables. Last accessed January 15, 2011 (Archived at PERAL). www.ers.usda.gov
- Meneghini, J., N. J. Ferla, F. M. Majolo, d. S. Rocha, G. L. da Silva, M. Toldi, and C. Dameda. 2011. Length of *Mononychellus planki* McGregor immature phases on arrowleaf sida and bean. III SIBAC - Simposio brasileiro de acarologia, Campinas-SP. Last accessed October 15, 2011 (Archived at PERAL), www.sibac.net.br/Palestras/Resumo%20Venzal_SIBAC_046.
- Migeon, A., and F. Dorkeld. 2010. Spider Mites Web: Species INRA/CBGP/IRD. Last accessed March 27, 2011, <http://www1.montpellier.inra.fr/CBGP/spmweb/index.php>.
- Millar, G. L., and M. B. Stoetzel. 1997. Aphids associated with chrysanthemums in the United States. *Florida Entomologist* 80(2).
- Miller, D. R., V. L. Blackburn, J. A. Davidson, and W. F. Gimpel, Jr. 1985. Pest risk assessment of armored scales on certain fruit [report submitted to USDA, Animal and Plant Health Inspection Service, Plant Protection and Quarantine]. United States Department of Agriculture (USDA), Agricultural Research Service (ARS), Beltsville, MD. 35 pp.
- Miller, D.R., Davidson, J.A., and Stoetzel, M.B. 1984. A taxonomic study of the armored scale *Pseudischnaspis* Hempel (Homoptera: Coccoidea: Diaspididae). *Proceedings of the Entomological Society of Washington* 86: 94-109.

- Miller, D. R., G. L. Miller, G. S. Hodges, and J. A. Davidson. 2005. Introduced scale insects (Hemiptera: Coccoidea) of the United States and their impact on U.S. agriculture. *Proceedings of the Entomological Society of Washington*. 107:123-158.
- Miller, G. L., A. S. Jensen, S. Nakahara, R. W. Carlson, D. R. Miller, and M. B. Stoetzel. 2000. Whitefly Web Page and Database Collaborators. *Systematic Entomology Laboratory Whitefly*. Last accessed November 21, 2011, <http://www.sel.barc.usda.gov/>.
- Miller, G. L., and D. R. Miller. 2002. *Dysmicoccus* Ferris and similar genera (Hemiptera: Coccoidea: Pseudococcidae) of the Gulf State Region including a description of a new species and new United States records. *Proceedings of the Entomological Society of Washington* 104(4):968-979.
- Mitchell, P. L. 2000. Leaf-footed bugs (Coreidae). Pages 337-403 in C. W. Schaefer and A. R. Panizzi, (Eds.). *Heteroptera of Economic Importance*. CRC Press Boca Raton, FL., USA.
- Montoya, A. 2008. Aclaración de reportes de plagas/ Aguacate plagas exóticas. Personal communication to A. Burgos on June 18, 2008., from Anibal Montoya. Instituto Colombiano Agropecuario (ICA).
- Morales, J., V. Morales, and J. Lopez. 2005. El Aguacate. Manejo Integrado del Cultivo. CORPOICA Bucaramanga. CORPOICA, Bucaramanga. 48 pp.
- Morales, O. 1994. El cultivo del Aguacate Memorias del curso regional de actualización en frutas tropicales Programa de Frutas tropicales C.I. Nataima. Espinal. Tolima. Mayo 1994.
- Mosquera, L. 1989. Taxonomía, hospedantes, distribución geográfica e importancia económica de la familia Diaspididae en Colombia. Aporte al desarrollo agrícola Colombiano. Sociedad Colombiana de Entomología. Bogotá.
- NAL. 2010. AGRICultural OnLine Access (AGRICOLA). National Agricultural Library (NAL). Last accessed October 22, 2010, <http://agricola.nal.usda.gov/>.
- NAPPO. 2000. Phytosanitary Alert System. *Frankliniella bruneri*. North American Plant Protection Organization (NAPPO). Last accessed August 9, 2007, <http://www.pestalert.org/viewArchPestAlert.cfm?rid=39>
- Nava, D., M. Haddad, and J. Parra. 2005. Exigências térmicas, estimativa do número de gerações de *Stenoma catenifer* e comprovação do modelo em campo. *Pesquisa agropecuária Brasileira* 40(10):961-967.
- Nava, D., and J. Parra. 2005. Biología de *Stenoma catenifer* Walsingham (Lepidoptera: Elachistidae) em Dieta Natural e Artificial e Estabelecimento de um Sistema de Criação. *Neotropical Entomology* 34(5):751-759
- Nava, D., J. Parra, J. Bento, G. Diez-Rodríguez, and M. Haddad. 2006. Distribuição Vertical, Danos e Controle Cultural de *Stenoma catenifer* Walsingham (Lepidoptera: Elachistidae) em Pomar de Abacate. *Neotropical Entomology* 35(4):516-522.
- Nelson, S. C. 2008a. Cephaleuros Species, the Plant-Parasitic Green Algae. Cooperative Extension Service. University of Haawaii. Plant Disease. Last accessed May 12, 2011, www.ctahr.hawaii.edu/oc/freepubs/pdf/PD-43.pdf
- Nelson, S. 2008b. Sooty Mold. Cooperative Extension Service. University of Haawaii. Plant Disease. Last accessed May 12, 2011, <http://scholarspace.manoa.hawaii.edu/handle/10125/12424>.
- Nguyen, R., A. Hamon, and T. Fasulo. 1998. *Aleurocanthus woglumi* Ashby. Florida Department of Agriculture and Consumer Services, Division of Plant Industry; University of Florida. Last accessed, November 20, 2007 (Archived at PERAL). http://creatures.ifas.ufl.edu/citrus/citrus_blackfly.htm
- NIS. 2008. Quarantine Status Confirmations. Personal communication to C. A. Bertone on December 11, 2008, from United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, National Identification Services (NIS). Archived at PERAL, Raleigh, NC.
- NIS. 2011a. Quarantine Status Confirmations. Personal communication to N. Arciniegas on August 31, 2011, from United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, National Identification Services (NIS).

- NIS. 2011b. Quarantine Status Confirmations. Personal communication to N. Arciniegas on August 31, 2011, from United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, National Identification Services (NIS).
- Niu, G., J. Siegel, M. A. Schuler, and M. R. Berenbaum. 2009. Comparative Toxicity of Mycotoxins to Navel Orangeworm (*Amyelois transitella*) and Corn Earworm (*Helicoverpa zea*). *Journal of chemical ecology* 35:951–957.
- Norrbom, A. L. 2004. Host plant database for *Anastrepha* and *Toxotrypana* (Diptera: Tephritidae: Toxotrypanini). Diptera Data Dissemination Disk (CD-ROM) 2: 5984 records.
- Norrbom, A. L., and K. C. Kim. 1988. A list of the reported host plants of the species of *Anastrepha* (Diptera: Tephritidae). U.S. Dept. Agric., Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Hyattsville, MD. 114 pp.
- NRCS. 2010. The PLANTS Database, Version 3.5. United States Department of Agriculture National Resources Conservation Service (USDA-NRCS), National Plant Data Center, Baton Rouge, LA. Last accessed January 13, 2011, <http://plants.usda.gov>.
- Ohr, H. D., M. D. Coffey, and J. McMillan, R. T. 2003. Diseases of Avocado (*Persea americana* Miller). APS. Last accessed March 04, 2008. <http://www.apsnet.org/online/common/names/avocado.asp>.
- Opler, P. A., K. Lotts, and T. Naberhaus. 2011. *Eacles imperialis*. Butterflies and Moths of North America. Bozeman, MT: Big Sky Institute. Big Sky Institute at Montana State University. Last accessed September 20, 2011, <http://www.butterfliesandmoths.org/>
- Orozco, J., and L. C. Pardo-Locarno. 2004. Description of immature stages of three species of American Cetoniinae (Coleoptera: Scarabaeidae: Cetoniinae). *Zootaxa* 769:1-14.
- Orozco, J. 2011. Request on *Gymnetis pantherina*. Personal communication to N. Arciniegas on October 13, 2011, from Jesús Orozco. Postdoctoral fellow. Molecular Ecology and Systematics Group. Department of Zoology and Entomology and Department of Botany. Rhodes University.
- Osorio, J. 2008. Oficio 41164 del 12 de septiembre de 2008. Personal communication to J. Cardenas on October 14, 2008, from This letter retracts some of the pests mentioned in Morales et al., 2005 and published by Corpoica.
- Ovruski, S., P. Schliserman, and M. Aluja. 2003. Native and Introduced Host Plants of *Anastrepha fraterculus* and *Ceratitis capitata* (Diptera: Tephritidae) in Northwestern Argentina. *Journal of economic entomology* 96(4):1108-1118.
- Peña, J. 2003. Pests of avocado in Florida. *Proceedings V World Avocado congress* pp. 483-494
- Peña, J. 2010. Plagas con importancia cuarentenaria para las zonas productoras de aguacate en Colombia. Pages 24-40. III Congreso Colombiano del Aguacate. Medellin, Colombia.
- Peña, J. E. 1998. Current and potential arthropods pests threatening tropical fruit crops in Florida. Pages 327-329. *Proceedings of Florida State Horticulture Society, Homestead, Florida*.
- Peña, J. E., and D. Bennett. 1995. Arthropods associated with *Annona* spp. In the Neotropics. *Florida Entomologist* 78(2):329-349.
- Peña, J. E., and A. V. Schoonhoven. 1976. Fluctuación de poblaciones de insectos y acarinos en yuca en la zona de Palmira, Valle del Cauca. *Revista Colombiana de Entomología* 2(4):115-132.
- Peña, J. E., J. L. Sharp, and W. M. 2002. Tropical fruit pests and pollinators: biology, economic importance, natural enemies, and control. Page 298. CAB International, Oxon, United Kingdom.
- Peña, L., and Lucero A. 2003. Manejo Integrado de Chizas en el Departamento de Nariño. Boletín divulgativo No 19 CORPOICA.
- PERAL. 2007. Phytosanitary risks associated with armored scales in commercial shipments of fruit for consumption to the United States, Revision Original. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Center for Plant Health Science and Technology, Plant Epidemiology and Risk Analysis Laboratory (PERAL), Raleigh, NC. 24 pp.
- PERAL. 2008. Plant Hardiness Zones of the United States: Area and Population Analysis. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and

- Quarantine, Center for Plant Health Science and Technology, Plant Epidemiology and Risk Analysis Laboratory (PERAL), Raleigh, NC. 6 pp.
- Peredo, C., C. H. Lyal, and V. K. Brown. 1999. The stenomatine moth, *Stenoma catenifer* Walsingham: a pre-dispersal seed predator of Greenheart (*Chlorocardium rodiei* (Schomb.) Rohwer, Richter and van der WerV) in Guyana. *Journal of Natural History* 33:531- 542.
- PestID. 2011. PestIDentification Database (PestID). United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine. Last accessed October 12, 2011, <https://moks14.aphis.usda.gov/aqas/login.jsp>.
- Peterson J. K. 1990. *Carya illinoensis* in: Burns, Russell M., and Barbara H. Honkala, tech. coords. (1990) *Silvics of North America: 1. Conifers; 2. Hardwoods*. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC. 2:877.
- Plattner, K., E. Dohman, and A. Perez. 2010. *Fruit and Tree Nuts Outlook*. Economic Research Service. Last accessed February 5, 2011,
- Ploetz, R. C., T. K. Kim, J. A. Menge, K. G. Rohrbach, and M. T.J. 2003. Common pathogens of tropical fruit crops. In: *Diseases of tropical fruit crops* (ed. R.C. Ploetz). CAB International Publishing. CAB International. Wallingford, UK. 527 pp.
- Pogue, M. 2006. The Noctuidae (Lepidoptera: Noctuidae) of Great Smoky Mountains National Park, U.S.A. *Zootaxa* 1215:1-95.
- Posada, L. 1989. *Lista de insectos dañinos y otras plagas en Colombia*. (Fourth). Colombian Agricultural Institute, Bogotá. 662 pp.
- Posada-Florez, F. J. 2011. Query on *Phyllocnistis perseafolia*. Personal communication to N. Arciniegas on June 7, 2011, from Posada-Florez, F. J. Entomologist and Independent crop advisor-researcher.
- PPQ. 2000. Guidelines for pathway-initiated pest risk assessments (version 5.02). United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ). Last accessed March 24, 2006, <http://www.aphis.usda.gov/ppq/prc/commodity/cpraguide.pdf>.
- PPQ. 2006. Peer review report for Importation of ‘Hass’ avocado (*Persea americana*) fruit from Peru into the Continental United States. August 30, 2006. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ), Riverdale, MD.
- PPQ. 2010. Federal Noxious Weed List. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ). (Archived at PERAL).
- PPQ. 2011a. Fresh Fruits and Vegetables Import Manual. Nonpropagative Manual. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ). (Archived at PERAL).
- PPQ. 2009. Treatment Manual. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ). Last accessed July 10, 2009. (Archived at PERAL).
- Quintero, A. 2006. Plagas de aguacate en Colombia. Encuentro nacional de la Cadena Productiva de aguacate Medellín. Noviembre 16-18, 2006.
- Rand, N. d., Z. v. Rooyen, J. d. Graaf, J. P. Bower, G. Lunt, and R. Lunt. 2010. The effect of gamma irradiation on the internal and external quality of avocados. *South African Avocado growers' association yearbook* 33:48-52.
- Randall, R. P. 2007. A Global Compendium of Weeds database Last accessed October 05, 2007, http://www.hear.org/gcw/species/phaseolus_vulgaris/.
- Ratnasingham, S., and P. D. N. Hebert. 2007. BOLD: The Barcode of Life Data System Molecular Ecology Notes 7:355-364.

- Reed, C. F. 1977. Economically Important Foreign Weeds. Potential problems in the United States. USDA-ARS, Washington, D.C. 746 pp.
- Reyes, J. C., G. Gonzalez, and T. Kondo. First record of the spider mite predator *Stethorus tridens* Gordon (Coleoptera: Coccinellidae) preying upon the red avocado mite *Oligonychus yothersi* McGregor (Acari: Tetranychidae). Boletín del Museo de Entomología de la Universidad del Valle 11(2):15/19.
- Rice, P. M. 2010. Noxious weeds in the US and Canada. INVADERS Database System. Division of Biological Sciences, University of Montana. Last accessed October 21, 2010, http://invader.dbs.umt.edu/Noxious_Weeds/.
- Ríos D., Corrales D., Daza J., and A. A. 2005. Aguacate. Variedades y patrones importantes para Colombia. Villagorgona, Candelaria (Valle). Pages 195. Impresora Feriva S.A., Cali, Colombia.
- Robinson, G. S., P. R. Ackery, I. J. Kitching, G. W. Beccaloni, and L. M. Hernández. 2011. HOSTS - A Database of the World's Lepidopteran Host plants. The Natural History Museum, Department of Entomology.
- Rodas, C. 1997. Cómo atacar un hongo y no rendirse en el intento. Revista Ciencia al Día. Agencia universitaria de periodismo científico (AUPEC). Universidad del Valle. Last accessed August 21, 2011, <http://aupec.univalle.edu.co/informes/octubre97/boletin50/arboles.html>
- Rondon, A., and Y. Guevara. 1984. Algunos aspectos relacionados con la muerte regresiva del aguacate (*Persea americana* Mill). Agronomía Tropical. 34(13):119-129
- Rubio, J. D., F. J. Posada, O. I. Osorio, L. F. Vallejo, and J. C. López. 2009. First record of *Heilipus elegans* Guérin-Méneville (Coleoptera: Curculionidae) attacking the avocado tree stem in Colombia. Revista UDCAactual. Divulgación científica 12(1) (in Spanish, English abstract).
- Rung, A., G. L. Venable, D. R. Miller, and R. J. Gill. 2007. Soft Scales. Systematic Entomology Laboratory-ARS, Center for Plant Health Science and Technology (CPHST), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA). Last accessed August 23, 2011, <http://www.sel.barc.usda.gov/ScaleKeys/ScaleInsectsHome/ScaleInsectsSoftScales.html>.
- Sagarra, L. A., and D. D. Peterkin. 1999. Invasion of the Caribbean by the hibiscus mealybug, *Maconellicoccus hirsutus* Green [Homoptera : Pseudococcidae]. Phytoprotection 2(80):103-113.
- Saldarriaga, A. 1977. Plagas de aguacate y su control en : Curso sobre frutales. Compendio No. 20. Instituto Colombiano Agropecuario (ICA) - Dirección de Comunicación rural. Programa de frutales. Regional No 4.
- Saldarriaga, A., and F. Posada. 1993. Moscas blancas de Colombia: reconocimiento, clasificación, daños y comportamiento. Pages: 259-287. Memorias XX Congreso de la Sociedad Colombiana de Entomología (SOCOLEN) Julio 13, 14, 15 y 16 de 1993.
- Salles, L. A. 1999. Behavior of *Anastrepha fraterculus*. in International Atomic Energy Agency (IAEA). (Ed.). The South American fruit fly, *Anastrepha fraterculus* (Wied.); advances in artificial rearing, taxonomic status, and biological studies. Proceedings of a workshop organized by the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, Villa del Mar, Chile. 202 pp.
- Saltaren, L. F., F. Varón de Agudelo, and F. Marmolejo. 1998. Nematodos y hongos asociados al sustrato y sistema radical de aguacate (*Persea americana* Mill). En viveros de propagación. ICA Palmira. Page 83. XIX Congreso Nacional de Fitopatología y Ciencias Afines. ASCOLFI. Mayo 27, 28 y 29 de 1998, San Juan de Pasto Colombia.
- Sánchez, G. 2000. Los trips, identificación y manejo. Page 9. Instituto Colombiano Agropecuario (ICA). Ministerio de Agricultura y Desarrollo Rural (MADR), Ibagué, Colombia.
- Sanderson, E. D. 1906. Report on miscellaneous cotton insects in Texas. United States Department of Agriculture (USDA). Bureau of Entomology. Bull No. 57. Last accessed July 5, 2011, <http://books.google.com/books?id=nm9WAAAAMAAJ&pg=PA56&lpg=PA56&dq=Oncometopia+undata&source=bl&ots=IoOqmGKOn9&sig=0dAgpnqOWAOJaWs8BFcRHxqqRw0&hl=en>

- &ei=fSMTTuegN8yutwfq9ejYDQ&sa=X&oi=book_result&ct=result&resnum=5&ved=0CCEQ6AEwBA#v=onepage&q=Oncometopia%20undata&f=false >
- SENASA and ProHass. 2010. Nonhost Status of Commercial Avocado (*Persea americana*) ‘Hass’ with respect to *Ceratitis capitata*, *Anastrepha fraterculus*, and *Anastrepha striata* (Diptera: Tephritidae) in Peru, La Molina, Peru. 196 pp. Servicio Nacional de Sanidad Agropecuaria Perú. (SENASA) and Peru Hass Avocado Growers Association (ProHass). 196 pp.
- Serna, L. M. 2004. Reconocimiento de especies del complejo chizas (Coleoptera: Melolonthidae), asociada a los cultivos de yuca y pasto en el municipio de Pereira y alrededores. Facultad de Ciencias Agropecuarias. Universidad de Caldas. 119 pp.
- Schaefer, C.W. and A.R. Panizzi. 2000. Heteroptera of Economic Importance. CRC Press, Boca Raton. 828 p.
- Siddiqi, M. R. 2000. Tylenchida parasites of plants and insects (Second edition). CABI Publishing, Oxon, UK and New York, NY. 813 pp.
- STRI. 2011. Digital file manager. STRI Office of Bioinformatics. Smithsonian Tropical Research Institute (STRI). Last accessed April 20, 2011, http://biogeodb.stri.si.edu/bioinformatics/PAPB/adv_search.php?plant_life_form=none&.
- Tamayo P. 2007. Enfermedades del Aguacate. Medellín, mayo - julio de 2007, pp. POLITÉCNICA (4): 51-70.
- Teliz, D. 2000. El Aguacate y su manejo integrado. Pages 117-133. Mundi Prensa México. S.A, Mexico.
- Thomas, M. C. 2000. List of Exotic Arthropod Species Established in Florida. In: The Exotic Invasion of Florida: A Report on Arthropod Immigration into the Sunshine State. Florida Department of Agriculture and Consumer Services. Division of Plant Industry. Last accessed June 4, 2007, <http://www.doacs.state.fl.us/pi/enpp/ento/images/exoticstable.pdf>
- UGA and CISEH. 2010. Invasive plant atlas of the United States. The University of Georgia (UGA) - Center for Invasive Species and Ecosystem Health (CISEH) and the National Park Service, Plant Atlas of New England, Invasive Plant Control, Inc., USDA Forest Service, USDA-NRCS-PLANTS Database, Lady Bird Johnson Wildflower Center, National Association of Exotic Pest Plant Councils, Plant Conservation Alliance, and Biota of North America Program. Last accessed September 21, 2010, <http://www.invasiveplantatlas.org/>
- University of California. 2011. Hass Avocado information home page. Agriculture and Natural Resources. Last accessed June 5, 2011, <http://www.ucavo.ucr.edu/>.
- University of Nebraska. 2008. Plant and insect parasitic Nematodes. University of Nebraska, Last accessed March 31, 2008, <http://nematode.unl.edupneglec.htm>.
- Uramoto, K., Zucchi, R. and Walder, J. 2001. Biodiversity of *Anastrepha* fruit flies (Dip., Tephritidae) on the Luiz de Queiroz campus, Piracicaba, Sao Paulo, Brazil. Pages 37-38. 4th Meeting of the Working Group on Fruit Flies of the Western hemisphere. Mendoza (Argentina).
- Uramoto, K. 2002. Biodiversidad de moscas-das-frutas do gênero *Anastrepha* (Diptera: Tephritidae) no campus Luiz de Queiroz, Piracicaba, São Paulo. Dissertação (mestrado) Escola Superior Ed Agricultura Luiz de Queiroz. 85p.
- Uramoto, K., J. Walder, and R. Zucchi. 2004. Biodiversidade de moscas-das-frutas do gênero *Anastrepha* (Diptera, Tephritidae) no campus da ESALQ-USP, Piracicaba, São Paulo. . Revista Brasileira de Entomologia 48 (3):409-414.
- Urueta, E. 1975a. Arañas rojas (Acarina: Tetranychidae) del Departamento de Antioquia. Revista Colombiana de Entomología 1(2 and 3):1- 14.
- Urueta, E. 1975b. Insectos y ácaros que infectan el cultivo del cacao en la región de Urabá. Gobernación de Antioquia., Medellín. 36 pp.
- Urueta, E. 1976. Registro de Nuevas Plagas en Antioquia. Notas y Noticias Entomológicas. Instituto Colombiano Agropecuario (ICA). Programa de entomologia (Enero-Febrero):21
- USFWS. 2011. Threatened and Endangered Species System, U.S. Fish and Wildlife Service (USFWS). Last accessed January 25, 2011. <http://ecos.fws.gov/>.

- Valle-De la Paz, A. R., H. Bravo-Mojica, H. González-Hernández, R. M. Johansen-Naime, A. Mojica-Guzmán, and M. Valle-De la Paz. 2003. Trips (Thysanoptera) en huertos de aguacate (*Persea americana* Miller) cv. Hass en Michoacán, México. Pages 481-486. Proceedings V World Avocado Congress (Actas V Congreso Mundial del Aguacate).
- Varon de Agudelo, F. 1991. *Cylindrocladium scoparium* asociado con el secamiento y muerte prematura de plantas de soya. *Fitopatología Colombiana* 15(1):2-8.
- Vélez, R. 1997. Plagas agrícolas de impacto económico en Colombia: bionomía y manejo integrado. *Ciencia y Tecnología*. Editorial Universidad de Antioquia. 482 pp.
- Ventura, M., D. Destro, E. López, and R. Montalván. 1999. Avocado moth (Lepidoptera: Stenomidae) damage in two avocado cultivars. *Florida Entomologist* 82(4):625-631.
- Villalobos, J. L., and F. Cárdenas. 2002. Lista de enfermedades de los cultivos agrícolas de Costa Rica. Ministerio de Agricultura y Ganadería. Servicio Fitosanitario del Estado. San José, Costa Rica. 82p
- Waite, G. K. 2008. *Copturus perseae*. Personal communication to Burgos Aura. Center for Phytosanitary Excellence on May 21, 2008, from Geoff Waite.
- Waite, G. K., and Martinez. B.R. 2002. Insect and mite pests: in A. W. Whiley, B. Schaffer, and W. B. N., (eds.). In *The Avocado: Botany, Production and Uses*. CAB International., Wallingford, UK.
- Watson, G. W. 2005. Arthropods of economic importance: Diaspididae of the world. An illustrated identification guide and information source. CD-ROM. Expert Center for Taxonomic Identification (ETI), University of Amsterdam, The Netherlands. ISBN No. 90-75000-48-0.
- Weber, E. 2003. *Invasive plant species of the world: A reference guide to environmental weeds*. CAB Publishing, Wallingford. 548 pp.
- Weems, H. V. J. 1969. *Anastrepha serpentina* (Wiedemann) (Diptera: Tephritidae). Florida Department of agriculture and consumer services. Entomology circular No. 91. 2p.
- Wellman, F. L. 1977. *Dictionary of Tropical American Crops and Their Diseases*. The Scarecrow Press, Inc. Metuchen, N. J. & London. 495 p.
- Wetterer, J., D. Runer, and J. E. Lopez. 1998. Foraging and nesting ecology of *Acromyrmex octospinosus* (Hymenoptera: formicidae) in a Costa Rican tropical dry forest. *The Florida Entomologist* 81(1):61-67
- White, I. M., and M. M. Elson-Harris. 1992. *Fruit flies of Economic Significance: Their identification and bionomics*. CAB International, Wallingford, UK. 601 p.
- Wiersema, J. H., and B. León. 1999. *World economic plants: A standard reference*. CRC Press, Boca Raton, Florida. 749 pp.
- Williams, D. J., and C. M. Granara de Willink. 1992. *Mealybugs of Central and South America*. CAB International, Wallingford, U.K.
- Woodruff, R. E., E. J. Gerberg, and T. J. Spilman. 2000. *Xylopsocus capucinus* (Fabricius) (Insecta: Coleoptera: Bostrichidae). Florida Department of Agriculture and Consumer Services, Division of Plant Industry (FDACS-DPI); originally published as DPI Entomology Circular 195. EENY179.
- Wright, M. G. 2011. Avocado. EXTension ENTOMology & UH-CTAHR Integrated Pest Management - Program Knowledge Master - Crop knowledge Master - Fruits and nuts. Last accessed September 22, 2011, <http://www.extento.hawaii.edu/kbase/crop/crops/fruits.htm>.
- WSSA. 2010. Composite list of weeds. Weed Science Society of America (WSSA). Last accessed April 25, 2007, <http://www.wssa.net/>.
- Zapata, A., Y. Hincapié, and A. Madrigal. Reconocimiento De Trips en cultivos de flores y áreas aledañas y biología de *Frankliniella panamensis* Hood (Thysanoptera: Thripidae) 1994. *Revista Colombiana de Entomología* 20(1):47-52.
- Zhang, B. C. 1994. *Index of Economically Important Lepidoptera*. CABI, Wallingford, UK. 599 pp.
- Zuluaga J. 1980. Importancia de los ácaros y su impacto en la agricultura. En: *seminario Acaros fitofagos*. Buga - Valle, Mayo 23 de 1980.

Zúñiga, G., R. Ortiz., and F. Varon de Agudelo. 1979. Nematodos asociados con el cultivo del plátano (Musa AAB' ó ABB) en el Valle del Cauca Fitopatología Colombiana 8(2).

5. Appendices

Appendix A. Harvest, post-harvest practices, and standard packinghouse procedures described for ‘Hass’ avocados produced in Colombia.

Sources: Arevalo, 2011; Consejo Nacional del Aguacate, 2011a; Londoño, 2006; NTC 5209 ICONTEC, 2003

Harvest

1. Personnel working on harvest process need to be trained and wear clean and appropriate clothing.
2. Fruits for exportation must be from healthy orchards with good nutrition schemes so the fruits tolerate harvest and post-harvest handling.
3. Avocado fruits are harvested when physiological maturity is reached (fruit reaches its climacteric process when starts to lose brightness). Post-harvest fruit quality will depend on this factor.
4. Harvested fruits require low humidity or free water on their surface to avoid fungal and bacterial infections and susceptibility to mechanical damage when handled. Therefore, harvest is not carried out when raining.
5. Fruits are manually harvested by cutting the peduncle (8 to 10 mm long) using scissors, or other tools that need to be in good condition, cleaned, and disinfected. In the process, tools are disinfected each time harvest changes from one plant to another.
6. Harvested fruits must be homogeneous in color. When any mechanical and insect damage is present, then fruits are discarded. Thus, to avoid mechanical (cuts and bruises) and insect damages or injuries that affect fruit quality; fruit contact to the soil; and unnecessary handling, is required.
7. Fruits are placed in clean plastic crates used exclusively for the harvest process. Each fruit box must be labeled with orchard location data.
8. Fruits are stored at 5-7°C and 85-90% RH. After harvest, avocados need to be protected from sun exposure at temporary collection points in order to preserve fruits quality.
9. The fruits are transported in clean, ventilated, and covered trucks, and moved within a short time to a post-harvest site.

Post-harvest

Post-harvest sites require:

1. Location near the orchard.
2. Identification of areas according to the activity conducted at each place.
3. Washable floors and doors.
4. Stainless steel selection tables and bands.
5. Authorized personnel access only.
6. Shoe disinfection at access points.
7. Protection of access and ventilation points to avoid entry of rodents and insects.
8. Use of exclusionary screens at the post-harvest site and packinghouse to avoid pests while all post-harvest practices are carried out.

Post-harvest practices (in some cases using grading and packaging bands) are as follows:

1. Place all fruit in the reception room.
2. A sample is taken to determine dry matter (21% is required).
3. Before bringing fruit to the post-harvest site, all debris (leaves, branches) is removed and moved to a disposal area.
4. Brushing and/or washing: these steps can be carried out together or in a separate manner (e.g., the EU only requires brushing). In this step fruits are brush cleaned to remove dust and other large particles, to add shine, and to remove some external pests.
5. Culling is done by visual inspection using bright lights. Fruit is discarded when color is not uniform, epidermal injuries are present (insect perforations, cuts; swellings; aqueous damages; scars; cracks; damage caused by frosts, hail, and sun blotch; rodent, bird, and insect bites), as well as spots (caused by pathogens, bird or insect excreta), external pests are present, and peduncles are not attached. Also, over-ripe fruit and fruit with strange odor are discarded.^a
6. Grading is based on color selection, sizing, and weight (in some packinghouses an automatic calibration weight system is used). These three features need to be homogenous for each box [for the EU size and weight are classified as follows: 12 (from 306-365 grams), 14(266-305), 16(236-265), 18(211-235), 20(191-210), and 22(171-190)] or as NTC 5209 ICONTEC (2003), ICA (2011) [A (equals or up to 120 gr), B (121-180 gr), C (181-240 gr), and D (less or equals to 241 gr)]; here, each fruit is visually checked again to discard any injured fruit or fruit that still shows disqualifying issues (e.g., external pests). All removed fruits are moved to a disposal area.
7. Fruits are packed in cardboard boxes perforated to allow maximum air flow; boxes for the EU market are four kilograms net weight set in one layer per box.
8. The traceability code and grades are marked on each box. Also, other information such as country of origin, packing company, net weight, and product description and variety are required.
9. Once avocados are packed and palletized they are kept at a temperature between 5.5°C and 4°C and with an 85-90% RH. Temperature controllers ('tempchecks') are used to guarantee that there have been no breaks in the cold chain.
10. Pallets of avocados will be shipped from the packinghouses to airport or seaport facilities in cold trucks (5.5°C and 85-90% RH). Security seals are used in the local transportation to avoid truck holds from being opened and tampered with. From Colombia to the United States shipments will take three to six hours on non-stop flights and between three to five days by sea to Gulf and East coast ports (Consejo Nacional del Aguacate, 2011c).

All avocado producers are required to:

1. Submit a list of pesticides used for each production lot.
2. Follow pre-harvest interval times (PIT) recommended by the pesticide manufacturers.
3. Have an ICA registration certificate for each production site where exports are expected.
4. Have a GLOBALGAP certification (e.g., required by EU).

^aVery small and old injuries (caused by mites or thrips), or mechanical damages exceeding five percent of the entire surface are not accepted. Fruits following this requirement are classified as 'Extra Category' (NTC 5209 ICONTEC, 2003).

Appendix B. Countries with permitted entry of Avocados into the United States.

Table B1. Countries from which avocado and Avocado ‘Hass’ can enter the United States (PPQ, 2011a).

Avocado		
Anguilla (United Kingdom) ^a	Grenada ^{a, b}	Philippines ^{b, c}
Antigua and Barbuda ^{a, b, c}	Guadeloupe ^{a, b, c}	Saint Barthelemy ^{a, b, c}
Bahamas ^{a, b, c, d}	Haiti ^{a, b, c, d}	Saint Kitts and Nevis ^{a, c}
Barbados ^{a, b, c}	Israel ^c	Saint Kitts and Nevis, From the Island of Nevis only ^{b, g}
Bermuda ^e	Jamaica ^{a, b, c, d}	Saint Lucia ^{a, c, g}
Cayman Islands (United Kingdom) ^{a, b, c}	Martinique ^{a, b, c}	Saint Martin ^a
Chile ^e	Mexico ^{e, f}	Saint Vincent and the Grenadines ^{a, e}
Curacao (Netherlands) ^a	Montserrat (United Kindom) ^{a, b, c}	Turks and Caicos Islands (United Kingdom) ^a
Dominica ^{a, b, c}	Netherlands Antilles, Except Curacao (Netherlands) ^a	Virgin Islands, British ^a
Dominican Republic ^e	New Zealand ^e	
Avocado, Hass		
Mexico (Michoacan) ^e	Peru ^e	

^a Ports in U.S. Virgin islands (VI)

^b Ports in Northern Pacific (NP)

^c Ports in North Atlantic (NA)

^d Ports in South Atlantic and Gulf

^e All ports

^f Seed removed

^g Ports in Puerto Rico

Appendix C. Current requirements for the entrance of *Persea americana* cv. Hass from different counties into the United States

Treatments: Methyl Bromide treatment (T104-a-1) and (T-101 c-1)^a, fumigation plus cold treatment (T108-a), and cold treatment (T107a)^b (PPQ, 2011b).

Pest-Free Area: Avocados from Chile require a Phytosanitary Certificate (PC) with an Additional Declaration (AD) stating that "The fruit in this consignment comes from an area that is not under quarantine for Mediterranean fruit fly (*Ceratitidis capitata*)" (PPQ, 2011b).

Preclearance: Avocado consignments from Jamaica may or may not be precleared. If they are precleared, the consignment must be accompanied by a PPQ Form 203 signed by the APHIS inspector on site in Jamaica to validate foreign site preclearance. If the consignment was not precleared, inspect and release (PPQ, 2011b).

Seed removal: The United States allows entry to non-commercial lots of avocados with seeds removed from Mexico into all ports except those in California, the Commonwealth of the Northern Mariana Islands, Florida, Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands (PPQ, 2011a).

Special Procedures for inspecting and Phytosanitary certificates (PC): These are required for:

- 'Hass' avocados from Michoacán, Mexico (PPQ, 2011a; 7 CFR 319.56–30) ^c.
- Inspection Procedures and a PC issued by Ministry of Agriculture and Forestry (MAF) of New Zealand for light brown apple moth (*Epiphyas postvittana*) (PPQ, 2011a).
- A PC issued by the NPPO of Peru with an Additional Declaration (AD) stating that the avocados in the consignment were grown, packed, and inspected and found to be free of pests in accordance with the requirements of 7 CFR 319.56-50^c.

Irradiation: Not an option for avocados (Rand et al., 2010).

^aT-101 c-1 is required for avocados from Israel and the Philippines.

^bT107a is required for 'Hass' avocados from Peru

^cA final rule amending the regulations to relieve certain restrictions regarding the movement of fresh 'Hass' avocados was published based on 7 CFR § 301 and 319 (2011). This final rule is actioned and warranted in light of research demonstrating the limited host status of 'Hass' avocados to Mediterranean fruit fly and South American fruit fly. This action amends the current rule by 1) removing trapping requirements for Mediterranean fruit fly for 'Hass' avocados imported from the State of Michoacán, Mexico and 2) removing treatment or origin from an area free of Mediterranean fruit fly and South American fruit fly for 'Hass' avocados imported from Peru (7 CFR § 301 and 319, 2011).

Appendix D. Decision sheets for *Persea americana* cv. Hass**Table D1.** Decision sheets for entry of avocados into the United States (CPHST, 2008). The symbol “—” indicates data were not available or legible, and entries where the decision was unclear were not listed.

Year	Country	Decision	Ports-of-entry (region) ^a	Reasons/Conditions
1923	West Indies	Approved	N	Authorized at Northern Port
1924	Colombia	Approved	NY	Only from Santa Marta Colombia
1924	Cuba	Approved	S	Authorized at Southern Ports. Without Southern Pacific, but only SAG.
1924	Grenada	Approved	N	Also approved at North (No.) Pacific Ports
1924	Haiti	Approved	N	—
1924	Peru	Approved	N	—
1925	Dominican Republic	Approved	S	Also approved at North Atlantic and Pacific Ports
1925	Dominican Republic	Approved	SAG	—
1925	Haiti	Approved	SAG	—
1925	Haiti	Approved	S	Also approved at North Atlantic and Pacific Ports
1925	Virgin Islands	Approved	NP	Approved also at North (No.) Pacific Ports
1926	Brazil	Disapproved	N and S	—
1926	Dominica	Approved	N	Also approved at North (No.) Pacific Ports
1926	Ecuador	Disapproved	N and S	—
1926	Samoan Islands	Disapproved	P	Disapproved for <i>Dacus</i>
1927	Bermuda	Disapproved	NP	—
1927	Philippines	Disapproved	NP and SP	—
1928	Peru	Disapproved	SP	—
1931	Haiti	Disapproved	S	—
1931	Argentina	Disapproved	N	—
1932	Fiji islands	Disapproved	SP	—
1932	Colombia	—	—	<i>Rhizoglyphus</i> was intercepted on Avocado
1932	Netherlands Antilles (Curacao)	Approved	N	—
1933	Chile	Approved	NA	—
1933	Honduras	—	E, NY	—

Year	Country	Decision	Ports-of-entry (region) ^a	Reasons/Conditions
1934	Cuba	Approved	SP and NP	—
1935	South Africa	Disapproved	All and NY	Report of <i>Physalospora perseae</i>
1935	West Indies	Approved	NP	—
1936	México	—	M	—
1936	México	—	M	—
1940	Jamaica	Approved	SAG	—
1941	Bahamas	Approved	SAG	—
1947-48	Colombia	—	—	Letter for the permit importation of avocado fruit from areas outside of the Santa Marta district of Colombia
1947	Cayman Islands	—	—	—
1948	Cayman Islands	—	—	—
1948	Tobago	Approved	NA, SAG, NP	—
1948	West Indies	—	—	—
1948	Curacao	Approved	NA, SAG, NP	—
1950	Brazil	Approved	ALL, NA, SAG, NP, M	—
1950	Central America	Approved	NA, NP, NO	Subject to inspection at that port
1950	Chile	Approved	NA	—
1950	México	Approved	NA, SAG, P	—
1950	South America	Disapproved (Argentina, Brazil, Ecuador, Venezuela)	—	—
1951	Liberia	Disapproved	—	—
1953	Colombia	Approved	N	Entry from all of Colombia
1961	Central America (Guatemala, El Salvador, Honduras, British Honduras, Nicaragua, Costa Rica y Panamá)	Disapproved	NA, NP	Request Treatment against the insects concerned
1961	Central America	Disapproved	—	Request for <i>Persea</i> spp.

Year	Country	Decision	Ports-of-entry (region) ^a	Reasons/Conditions
1961	Colombia	Disapproved	—	<i>Stenoma catenifer</i> and <i>Heilipus</i> were intercepted on Avocado “Importations from the Santa Marta Valley be rescinded and that importations of the fruit from any other part of Colombia be denied until a satisfactory treatment has been developed”
1961	Japan	Disapproved	AK	—
1961	Japan	Disapproved	—	Request for <i>Persea</i> spp.
1963	Israel	Approved	All; NA, SAG; NP, M	—
1965	Jamaica	Approved	All	—
1965	Jamaica	Approved	—	Request for <i>Persea</i> spp.
1967	Israel	Disapproved	—	—
1969	Israel	—	—	—
1969	Peru	Disapproved	—	As indicated in recommendation under Entomology findings
1969	Peru	Disapproved	—	Request for <i>Persea</i> spp.
1969	South Africa	—	NA	Memo: <i>Ceratitis capitata</i> , <i>C. rosa</i> and <i>Cryptophlebia leucotreta</i> attack avocado in South Africa
1970	Colombia	Disapproved	—	Request for <i>Persea</i> spp. Prohibited for <i>Stenoma catenifer</i>
1970	Colombia	Disapproved	—	Request for <i>Persea</i> spp. No approved treatment for fruit flies or seed pests occurring there
1970	Philippines	Approved	NA, NP	Request for <i>Persea</i> spp. Treatment as a conditions of entry
1970	South Africa	Disapproved	—	Request for <i>Persea</i> spp. No treatment available for false codling moth
1971	Ceylon	Disapproved	—	Request for <i>Persea</i> spp. No approved treatment available for pests /host complex
1971	South Africa	Disapproved	—	Lack of suitable treatments and Entomological evaluation
1971	South Africa	—	NA	Letter: <i>Ceratitis capitata</i> , <i>C. rosa</i> and <i>Cryptophlebia leucotreta</i> attack avocado in South Africa

Year	Country	Decision	Ports-of-entry (region) ^a	Reasons/Conditions
1972	Mexico	Disapproved	All	Request for <i>Persea</i> spp. No approved treatment for the pests attacking the fruit
1973	Mexico	—	All	—
1974	Brazil	Disapproved	NY	There are no effective treatments for <i>S. catenifer</i> , <i>Anastrepha</i> spp., and other seed boring insects.
1974	Colombia	Disapproved	NY	There are no effective treatment for <i>Stenoma catenifer</i> , <i>Anastrepha</i> spp. and other insects
1974	Israel Philippines	—	—	—
1974	West Indies (St. Vincent)	Approved	PR	Subject to inspection and further quarantine action when warranted by pests findings
1975	Chile	Disapproved	—	No approved treatment for <i>Anastrepha fraterculus</i> and <i>Ceratitis capitata</i>
1975	Netherlands Antilles (St. Eustatius)	Approved	NA	Subject to inspection
1975	México	Approved	NP	Subject to inspection
1976	Bermuda	Approved	NA	Methyl Bromide fumigation (T105 c)
1977	Cook Islands	Disapproved	—	Species of <i>Dacus</i> for which no treatments are approved
1977	Chile	Disapproved	—	No approved treatment for <i>Anastrepha fraterculus</i> and <i>Ceratitis capitata</i>
1978	New Hebrides islands	Disapproved	—	No approved treatment for fruit flies and fruit boring insects
1979	Kenya	Disapproved	All	An exotic fruit fly for which there is no approved treatment
1980	Cook Islands	Disapproved	—	All species of <i>Dacus</i> are fruit flies which do not occur in the Continental United States
1980	Kenya	Disapproved	All	No approved treatment
1980	Trinidad y Tobago	—	—	Letter of presence of <i>Stenoma catenifer</i>
1981	Venezuela	Disapproved	NA, NP	No treatment available for <i>Stenoma catenifer</i> or complex of <i>Anastrepha</i> spp.
1982	Chile	Approved	All	Inspection and certification as to origin in Med fly-Free area

Year	Country	Decision	Ports-of-entry (region) ^a	Reasons/Conditions
1984	Trinidad y Tobago and Curacao	Disapproved	All	Species of the fruit flies <i>Anastrepha</i> for which there is no acceptable treatment (Present approval for North Atlantic Ports will be removed)
1987	Grenada	Approved	All	Inspection and treatment if warranted by pests findings
1986	Spain	Disapproved	All	No acceptable treatment for <i>Ceratitis capitata</i>
1988	Bermuda	Approved	All	Inspection and treatment if warranted by pest finding
1988	Mexico	Disapproved	All	A complex of exotic plant disease organisms for which there is no approved treatment
1988	Spain	Disapproved	—	No acceptable treatment
1989	Bermuda	Approved	All	Inspection treatment if warranted
1989	Liberia	Disapproved	All	No acceptable treatment for the exotic fruit flies <i>Ceratitis capitata</i> and <i>C. rosa</i>
1989	New Zeland	Approved	All	Inspection and treatment if warranted by pest finding
1989	Sierra Leone	Disapproved	All	Request for <i>Persea</i> spp. No approved USDA treatment for <i>Ceratitis capitata</i>
1990	Argentina	Disapproved	All	No approved treatment for <i>Ceratitis capitata</i> and <i>Anastrepha</i> spp.
1990	Australia	Disapproved	All	No acceptable treatment for <i>Ceratitis capitata</i> or <i>Dacus tryoni</i>
1990	Costa Rica	Disapproved	All	No approved treatment available
1990	Indonesia	Disapproved	All	APHIS does not have a FIFRA section 18 exception to treat avocado
1990	Liberia	Disapproved	All	No acceptable treatment for exotic fruit flies <i>Ceratitis capitata</i>
1991	Argentina	Disapproved	—	No approved treatment for <i>Ceratitis capitata</i> and <i>Anastrepha</i> spp.
1991	Ecuador	Disapproved	All	No approved treatment available
1991	Ghana	Disapproved	All	No approved treatment
1991	Hawaii	Approved	All	Subject to inspection
1991	Ivory Coast	Disapproved	All	No approved treatment
1992	Australia	Disapproved	All	Insufficient data. No approved treatment

Year	Country	Decision	Ports-of-entry (region) ^a	Reasons/Conditions
1992	Guatemala	—	All	—
1992	Indonesia	Disapproved	—	APHIS does not have a FIFRA section 18 exemption to treat avocado
1992	México (Michoacán)	Approved	AK	Subject to conditions listed in attached regulatory proposal
1993	Costa Rica	Disapproved	—	No approved treatment available
1993	Cote d' Ivore	Disapproved	—	No approved treatment
1993	Ecuador	Disapproved	—	No approved treatment available
1993	French Polynesia	Disapproved	All	See Entomology Findings (<i>Bactrocera psidii</i> , <i>B. tryoni</i> , polyphagous pests in the area and <i>Helicoverpa armiguera</i>)
1993	Ghana	Disapproved	—	No approved treatment
1993	Hawaii	Approved	All	Subject to treatment W/T102 (a), T101 (c) and T108 (a)
1994	French Polynesia	Disapproved	—	PPQ lacks an approved treatment for <i>Bactrocera psidii</i> and <i>B. tryoni</i>
1994	Guatemala	Disapproved	—	No approved treatment
1995	Hawaii	Approved	All	Subject to inspection
1995	Mexico	Approved	—	Supplement PRA
1995	South Africa	Disapproved	All	No PPQ treatment for pests associates with host (<i>Ceratitis capitata</i> , <i>C. cosyra</i> , <i>Pterandrus rosa</i> and <i>Cryptophlebia leucotreta</i>)
1996	South Africa	Disapproved	—	No PPQ treatment

^a Ports-of-entry, or regions, are: AK= Alaska, All, E= Eastern Port, M= Mexican Border Ports, N= Northern Port, NA = North Atlantic, NP = North Pacific, NO= New Orleans, NY= New York, P= Pacific (Coast) Ports, PR= Puerto Rico, S =Southern Ports, SA = South Atlantic, SAG = South Atlantic & Gulf, and SP = South Pacific.

^b This entry combines information from several separate sheets to make a complete record.

Appendix E. Pest interceptions on *Persea americana* entering the United StatesTable E1. Pest interceptions on *Persea americana* from 1985 to 2011 (PestID, 2011).

Pest	Origin	Interceptions (no.)	Where found
<i>Abgrallaspis aguacatae</i>	Chile, Mexico, Unkown	1707	Baggage, General cargo, Permit cargo
<i>Abgrallaspis cyanophylli</i>	Chile, Dominican Republic, Mexico, Nigeria, Peru, Unkown,	16	Baggage, Mail, Permit cargo
<i>Abgrallaspis perseus</i>	Mexico	87	Bagaje, General cargo, Miscellaneous, Permit cargo,
<i>Abgrallaspis</i> sp.	Bahamas, Chile, Dominican Republic, Ecuador, Guatemala, Jamaica, Mexico, Nigeria, Unknown	57	Baggage, General cargo, Permit cargo, Stores
<i>Acanthocheila armigera</i>	Mexico	1	Baggage
<i>Acanthoscelides obtectus</i>	El Salvador, Mexico	2	Baggage
<i>Acanthoscelides obvelatus</i>	Mexico	5	Baggage, Mail
<i>Acari</i> , species of	Guatemala, Hawaii, Mexico	4	Baggage
	Mexico	1	Baggage
<i>Aconophora</i> sp.			
<i>Acremonium</i> sp.	Kenya	1	Stores
<i>Acutaspis albopicta</i>	Honduras, Mexico, Unknown	2916	Baggage, Permit cargo
<i>Acutaspis perseae</i>	Mexico	6	Baggage, Permit cargo
<i>Acutaspis rhizophorae</i>	Dominica	1	Permit cargo
<i>Acutaspis</i> sp.	Mexico, Unknown	8	Baggage, Permit cargo
<i>Aelodes</i> sp.	Dominican Republic	1	Permit cargo
<i>Aeolus</i> sp.	Dominican Republic	1	Permit cargo
<i>Aeolothripidae</i> , species of	El Salvador	1	Baggage
<i>Aethalion</i> sp.	Mexico	1	Baggage
<i>Africaleurodes</i> sp.	Liberia	1	Baggage
<i>Agistemus</i> sp.	Mexico	3	Baggage
<i>Agromyzidae</i> , species of	Mexico	3	Baggage
<i>Agrotis</i> sp.	Chile	26	Permit cargo
<i>Ahasverus advena</i>	Mexico	1	Baggage
<i>Aleurocanthus woglumi</i>	Mexico	2	Baggage
<i>Aleurocerus palmae</i>	Mexico	1	Permit cargo
<i>Aleuroclava</i> sp.	Mexico	1	Baggage
<i>Aleurodicus dispersus</i>	Nigeria, Philippines	3	Baggage
<i>Aleurodicus dugesii</i>	Mexico	5	Baggage
<i>Aleurodicus maritimus</i>	Mexico	1	Baggage
<i>Aleurodicus pulvinatus</i>	Haiti, Mexico	1	Baggage
<i>Aleurodicus rugioperculatus</i>	Mexico	2	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Aleurodicus</i> sp.	Guatemala, Mexico, Puerto Rico	6	Baggage
<i>Aleurodothrips fasciapennis</i>	Dominican Republic	1	Permit cargo
<i>Aleuroglandulus innanis</i>	Mexico	1	Baggage
<i>Aleurolobus</i> sp.	Viet Nam	1	Baggage
<i>Aleuroparadoxus</i> sp.	Mexico	1	Baggage
<i>Aleuroplatus cococolus</i>	Mexico	15	Baggage, Mail
<i>Aleuroplatus</i> sp.	Mexico	6	Baggage
<i>Aleuropleurocelus abnormis</i>	El Salvador, Jamaica, Mexico, Spain	45	Baggage, General cargo, Mail
<i>Aleuropleurocelus</i> sp.	Mexico	2	Baggage
<i>Aleurothrixus floccosus</i>	Mexico	2	Baggage
<i>Aleurothrixus</i> sp.	Mexico	3	Baggage
<i>Aleurotrachelus</i> sp.	Antigua and Barbuda, Jamaica, Mexico, Trinidad and Tobago	159	Baggage, Stores
<i>Aleurotulus</i> sp.	Mexico	1	Baggage
<i>Aleyrodidae</i> , species of	Canada, Costa Rica, Ecuador, El Salvador, Guatemala, Hawaii, Honduras, Jamaica, Mexico, Philippines, Puerto Rico, West Indies	66	Baggage, Mail, Permit cargo
<i>Aleyrodinae</i> , species of	Mexico	17	Baggage, General cargo
<i>Alternaria</i> sp.	Ecuador, Mexico	4	Baggage
<i>Allopeas micra</i>	Jamaica	1	Baggage
<i>Amblyseius</i> sp.	Mexico	1	Baggage
<i>Amorbia</i> sp.	Mexico	6	Baggage, Permit cargo
<i>Amphiacusta caraibea</i>	Dominican Republic	1	Permit cargo
<i>Anasa</i> sp.	Mexico	1	Baggage
<i>Anasa tristis</i>	Mexico	1	Baggage
<i>Anastrepha ludens</i>	Mexico	2	Permit cargo
<i>Anastrepha</i> sp.	Colombia, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Peru, Venezuela	35	Baggage, Holds, Mail, Stores
<i>Anaxipha</i> sp.	Dominican Republic	1	Permit cargo
<i>Anomala</i> sp.	Mexico	3	Permit cargo
<i>Anastrepha striata</i>	Mexico	1	Baggage
<i>Anomis flava</i>	Dominican Republic	1	Permit cargo
<i>Anthicidae</i> species of	Mexico	2	Baggage
<i>Anthocoridae</i> species of	Jamaica, Mexico	7	Baggage, Permit cargo
<i>Anthomyiidae</i> species of	Mexico	1	Baggage
<i>Anthonomus</i> sp.	Mexico	2	Baggage
<i>Anthribidae</i> , species of	Bahamas	1	Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Antiteuchus tripterus</i>	Cote D'Ivoire	1	Baggage
<i>Anurogryllus muticus</i>	Dominican Republic	1	Permit cargo
<i>Aonidia lauri</i>	Portugal	1	Baggage
<i>Aonidia</i> sp.	Mexico	1	Baggage
<i>Aonidiella aurantii</i>	Mexico, Peru	2	Baggage
<i>Aonidiella orientalis</i>	Brazil, Colombia, Cuba, Dominican Republic, Ecuador, Kenya, Mexico, Peru, Venezuela	22	Baggage, Permit cargo
<i>Aonidiella</i> sp.	Mexico, South Africa	3	Baggage
<i>Apantesis</i> sp.	Mexico	2	Baggage
<i>Aphididae</i> , species of	Dominican Republic, Haiti, Indonesia, Mexico, Puerto Rico, Peru	18	Baggage, Permit cargo
<i>Apidae</i> species of	Mexico	1	Baggage
<i>Apion</i> sp.	Chile, Mexico	4	Baggage, Permit cargo
<i>Aprostocetus</i> sp.	Mexico	1	Baggage
<i>Araecerus</i> sp.	Jamaica	1	Baggage
<i>Araptus</i> sp.	Mexico	1	Baggage
<i>Aranae</i> , species of	Dominican Republic, Haiti, Mexico	4	Baggage
<i>Arctiidae</i> , species of	Guatemala, Mexico	7	Baggage
<i>Arhyssus tricostatus</i>	Chile	1	Permit cargo
<i>Aschersonia</i> sp.	Mexico	1	General cargo
<i>Ascidae</i> , species of	Mexico	2	Baggage
<i>Ascochyta</i> sp.	Ecuador, Italy, Jamaica, Mexico, Unknown	37	Baggage, Mail, Permit cargo,
<i>Asiothrixus antidesmae</i>	Haiti	1	Baggage
<i>Aspidiotini</i> species of	Mexico, Unknown	7	Baggage, Permit cargo
<i>Aspidiotus destructor</i>	Ecuador, Mexico, Peru	4	Baggage
<i>Aspidiotus nerii</i>	Chile, Jamaica, Lebanon, Mexico	7	Baggage, Mail
<i>Asteromella</i> sp.	Mexico	2	Baggage
<i>Astigmata</i> , species of	Guatemala, Mexico	2	Baggage
<i>Ataenius</i> sp.	Mexico	1	Permit cargo
<i>Athlia rustica</i>	Chile	2	Permit cargo
<i>Attagenus</i> sp.	Mexico	1	Baggage
<i>Auchenorrhyncha</i> , species of	Mexico, Puerto Rico	4	Baggage, Permit cargo
<i>Aulacaspis</i> sp.	Philippines	1	Baggage
<i>Aulacaspis tubercularis</i>	Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Mexico, Puerto Rico, Trinidad and Tobago	52	Baggage, General cargo, Permit cargo, Stores
<i>Bactrocera cucurbitae</i>	Hawaii	9	Baggage, Mail

Pest	Origin	Interceptions (no.)	Where found
<i>Bactrocera dorsalis</i>	Hawaii, Unknown	190	Baggage, Mail, Permit cargo
<i>Bactrocera</i> sp.	Asia Country, Fiji, Hawaii, Philippines	189	Baggage, Mail
<i>Bagnalliella</i> sp.	Mexico	1	Baggage
<i>Baridinae</i> , species of	Mexico	1	Baggage
<i>Bdellidae</i> species of	Dominican Republic	1	Permit cargo
<i>Bemisia tabaci</i>	Mexico	1	Baggage
<i>Bephratelloides cubensis</i>	Jamaica	1	Baggage
<i>Blapstinus punctulatus</i>	Chile	1	General cargo, Permit cargo
<i>Blapstinus</i> sp.	Chile, Dominican Republic, Mexico	23	Baggage, Miscellaneous, Permit cargo
<i>Blastobasinae</i> , species of	Philippines, Mexico	2	Baggage
<i>Blattodea</i> species of	Mexico	1	Baggage
<i>Botryosphaeria</i> sp.	Mexico	1	Baggage
<i>Braconidae</i> species of	Mexico, Trinidad and Tobago	2	Baggage
<i>Brevipalpus obovatus</i>	Dominican Republic, Mexico	2	Permit cargo
<i>Brevipalpus phoenicis</i>	Mexico	2	Baggage
<i>Brevipalpus</i> sp.	Congo, Dominican Republic, Mexico	10	Baggage, Permit cargo
<i>Bruchidae</i> , species of	Chile, Nicaragua	2	Baggage, Permit cargo
<i>Cadra cautella</i>	Viet Nam	1	Baggage
<i>Calsucciena</i> aff. <i>luteola</i>	Mexico	1	Permit cargo
<i>Calliphoridae</i> , species of	Hawaii	1	Baggage
<i>Camarosporium</i> sp.	Mexico	1	Baggage
<i>Capaneus tetricus</i>	Mexico	1	General cargo
<i>Carabidae</i> , species of	Mexico, Dominican Republic	3	Baggage
<i>Cardiophorus</i> sp.	Mexico	1	Baggage
<i>Cataenococcus</i> sp.	Mexico	1	Baggage
<i>Caulophilus oryzae</i>	Mexico, Dominican Republic	3	Baggage, Permit cargo
<i>Caulophilus</i> sp.	Dominican Republic	1	Permit cargo
<i>Cecidomiidae</i> species of	Mexico	1	Baggage
<i>Cephaleuros</i> sp.	Mexico	9	Baggage, Mail
<i>Cephaleuros virescens</i>	Colombia, Mexico	98	Baggage, General cargo, Mail, Permit cargo
<i>Cerambycidae</i> , species of	Chile	1	Permit cargo
<i>Ceratitis capitata</i>	Brazil, Hawaii, India, Spain, Unknown	9	Baggage, Mail, Quarters
<i>Ceratitis</i> sp.	Nigeria	2	Baggage, Permit cargo
<i>Cercopidae</i> , species of	Mexico	1	Baggage
<i>Cercospora perseae</i>	Mexico	1	Baggage
<i>Cercospora purpurea</i>	Mexico	2	Mail, Baggage
<i>Cercospora</i> sp.	Ghana, Mexico	4	Baggage, Stores
<i>Ceroplastes floridensis</i>	Mexico	1	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Ceroplastes rubens</i>	Dominican Republic, Jamaica, Puerto Rico,	10	Baggage, Permit cargo
<i>Ceroplastes</i> sp.	Philippines	1	Baggage
<i>Chalara</i> sp.	Mexico	1	Baggage
<i>Chaetothyria tenuissima</i>	Peru	1	Baggage
<i>Chalcidoidea</i> , species of	Mexico, Unknown	3	Baggage, Permit cargo
<i>Chaelcodermus</i> sp.	Mexico	1	Permit cargo
<i>Cheletogenes ornatus</i>	Mexico	1	Baggage
<i>Cheyletidae</i> , species of	Dominican Republic	4	Permit cargo
<i>Cheylostigmaeus</i> sp.	Mexico	1	Baggage
<i>Chlorocoris distinctus</i>	Mexico	1	Baggage
<i>Chlorocoris</i> sp.	Guatemala, Honduras	2	Baggage
<i>Chloropidae</i> , species of	Mexico, Turkey	5	Baggage
<i>Chrysauginae</i> species of	Mexico	1	Baggage
<i>Chrysodina</i> sp.	Mexico	1	Permit cargo
<i>Chrysomelidae</i> , species of	Dominican Republic, Mexico	4	Baggage, Permit cargo
<i>Chrysomphalus aonidum</i>	Argentina, Mexico, Peru, South Africa	8	Baggage
<i>Chrysomphalus dictyospermi</i>	Australia, Brazil, Colombia, Dominican Republic, Ecuador, Mexico, Peru, Puerto Rico, South Africa,	21	Baggage, General cargo, Permit cargo, Stores,
<i>Chrysomphalus pinnulifer</i>	Canary Islands, Colombia, Guatemala, Kenya, Peru	9	Baggage, Stores
<i>Chrysomphalus</i> sp.	Costa Rica, El Salvador, Peru	3	Baggage
<i>Cicadellidae</i> , species of	Costa Rica, Dominican Republic, El Salvador, Guatemala, Haiti, Jamaica, Mexico, Philippines, Puerto Rico, Unknown, West Indies Country	132	Baggage, Mail, Permit cargo,
<i>Cicadellinae</i> , species of	Mexico	1	Baggage
<i>Cixiidae</i> , species of	Mexico	1	Baggage
<i>Cladosporium</i> sp.	Brazil, Dominican Republic, Ecuador, El Salvador, Germany, Guatemala, Guinea, Israel, Jamaica, Mexico, Nigeria, Peru, South Africa, Spain, Unknown, Venezuela Viet Nam	48	Baggage, General cargo, Stores
<i>Coccidae</i> , species of	Dominican Republic, El Salvador, Ghana, Guatemala, Israel, Jamaica, Mexico, Nicaragua, Philippines, Puerto Rico, United Kingdom, West Indies	43	Baggage, Mail, Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Coccinellidae</i> , species of	Chile, Mexico	7	Baggage, Permitt cargo
<i>Coccoidea</i> , species of	Mexico	2	Baggage
<i>Coccotrypes</i> sp.	Colombia, Dominican Republic , Haiti, Venezuela	10	Baggage, General cargo, Permitt cargo
<i>Coccus hesperidum</i>	Mexico, Peru, Philippines	6	Baggage
<i>Coccus</i> sp.	Mexico	1	Baggage
<i>Coccus viridis</i>	Mexico, Cuba, Haiti, Philippines, Puerto Rico	5	Baggage
<i>Cochylidae</i> , species of	Mexico	1	Baggage
<i>Coelomycetes</i> , sp.	Brazil, Jamaica, Mexico, Unknown	9	Baggage, General cargo, Stores
<i>Coleophoridae</i> , species of	Philippines	1	Baggage
Coleoptera, species of	Dominican Republic, Ecuador	3	Baggage, Permit cargo,
<i>Coleosporium plectranthi</i>	Korea, South	1	Baggage
<i>Collembola</i> , species of	Dominican Republic, Honduras, Mexico	5	Baggage, Permit cargo
<i>Colletotrichum crassipes</i>	Costa Rica, Dominican Republic, Unknown	3	Baggage, Permit cargo
<i>Colletotrichum gloeosporioides</i>	Asia Country, Colombia, Costa Rica, Cuba, Dominican Republic , El Salvador, Ghana, Jamaica, Honduras, South, Mexico, Philippines, Portugal, Unknown, South Korea, Nigeria, Panama	116	Baggage, General cargo, Permit cargo, Stores, Mail
<i>Colletotrichum</i> sp.	Costa Rica, Colombia, Guatemala, Jamaica, Mexico, Portugal, Uganda, Unknown, Dominican Republic, Israel, Nicaragua	35	Baggage, Permit cargo
<i>Comstockiella sabalis</i>	Mexico	1	Baggage
<i>Coniopterygidae</i> species of	Mexico	2	Baggage
<i>Coniothyrium</i> sp.	Mexico	57	Baggage
<i>Conoderus rufangulus</i>	Chile	1	Permit cargo
<i>Conoderus</i> sp.	Dominican Republic	3	General cargo, Permit cargo
<i>Conotrachelus aguacatae</i>	El Salvador, Mexico, Venezuela	198	Baggage, Stores
<i>Conotrachelus perseae</i>	El Salvador, Guatemala, Honduras, Mexico, Panama, Venezuela	145	Baggage, Mail, Stores, Quarters
<i>Conotrachelus</i> sp.	Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua	133	Baggage, Permit cargo, Mail, Miscellaneous
<i>Contarinia</i> sp.	Mexico	1	Baggage
<i>Copitarsia</i> sp.	Chile	18	Permit cargo
<i>Copturus</i> sp.	Mexico	6	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Coreidae</i> , species of	Mexico	1	Baggage
<i>Cornu aspersum</i>	Mexico	1	Baggage
<i>Corythucha gossypii</i>	Mexico	2	Baggage
<i>Corythucha unifasciata</i>	Mexico	1	Baggage
<i>Cosmopterigidae</i> , species of	El Salvador	2	Baggage
<i>Cossidae</i> , species of	Panama	1	Stores
<i>Cossonus</i> sp.	Mexico	1	Baggage
<i>Crambidae</i> , species of	El Salvador, Chile Dominican Republic	5	Baggage, Permit cargo
<i>Craspeduchus bilimeki</i>	Mexico	1	Baggage
<i>Crophius</i> sp.	Mexico	1	Baggage
<i>Cryptocline paradocxa</i>	Mexico	1	Mail
<i>Cryptophlebia</i> sp.	Ghana, Nigeria	4	Baggage
<i>Cryptostostigmata</i> species of	Mexico	1	Baggage
<i>Cucujidae</i> species of	Mexico	1	Baggage
<i>Culicidae</i> species of	Dominican Republic	1	Permit cargo
<i>Curculionidae</i> , species of	Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Venezuela, Unknown	291	Baggage, Mail, Permit cargo
<i>Cyclocephala mafaffa</i>	Mexico	1	Baggage
<i>Cyclocephala</i> sp.	Dominican Republic, Mexico	7	Baggage
<i>Cyclorrhapha</i> , species of	Jamaica	1	Baggage
<i>Cydnodromella pilosa</i>	Mexico	1	Baggage
<i>Cylas formicarius</i>	Dominican Republic	1	Permit cargo
<i>Cymbaeremaeidae</i> , species of	Mexico	1	Baggage
<i>Cynipidae</i> , species of	Mexico	1	Baggage
<i>Czempinskia transversostriata</i>	Mexico	1	Baggage
<i>Dacinae</i> , species of	Hawaii	2	Baggage, Permit cargo
<i>Dacryodes edulis</i>	Nigeria	1	Baggage
<i>Dacus cucurbitae</i>	Hawaii	4	Baggage
<i>Dacus dorsalis</i>	Hawaii	80	Baggage
<i>Dallasiellus</i> sp.	Mexico	1	Permit cargo
<i>Dendrobiella aspera</i>	Mexico	1	Baggage
<i>Dendrocoris humeralis</i>	Mexico	1	General cargo
<i>Deraeocoris</i> sp.	Mexico	1	Baggage
<i>Deroceas laeve</i>	Dominican Republic	1	Permit cargo
<i>Diabrotica porracea</i>	Mexico	1	Permit cargo
<i>Dialeurodicus</i> sp.	Mexico	1	Baggage
<i>Diaphania</i> sp.	Bahamas, Mexico, West Indies	3	Baggage, Permit cargo
<i>Diaporthe citri</i>	Panama	1	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Diaspididae</i> , species of	Barbados, Bahamas, Brazil, Dominica, Chile, Cuba, Dominican Republic, Ecuador, El Salvador, Ghan, Guatemala, Guyana, Hawaii, Honduras, Israel, Jamaica, Mexico, Peru, Philippines, Puerto Rico, St. Lucia, Trinidad and Tobago, US Virgin islands, Unknown, Venezuela	235	Baggage, General cargo, Mail, Permit cargo
<i>Diaspidiotus perniciosus</i>	Peru	1	Baggage
<i>Diaspidiotus</i> sp.	Mexico, Monaco, Unknown	7984	Baggage, General cargo, Permit cargo
<i>Diaspis boisduvalii</i>	Mexico, Unknown	102	Baggage, Mail, Permit cargo
<i>Diaspis</i> sp.	Chile, Costa Rica, Guatemala, Mexico	98	Baggage, Mail, Stores
<i>Didymella</i> sp.	Jamaica, Mexico	5	Baggage
<i>Didymosphaeria</i> sp.	Jamaica, Mexico	2	Baggage
<i>Diospyros</i> sp.	Ecuador	1	Baggage
<i>Diphthera festiva</i>	Dominican Republic	1	Permit cargo
<i>Diplodia</i> sp.	Mexico	16	Baggage, Permit cargo
<i>Diplotaxis</i> sp.	Mexico	1	Permit cargo
<i>Dipropus</i> sp.	Dominican Republic	1	Permit cargo
<i>Diptera</i> , species of	Cuba, Dominican Republic, Hawaii, Mexico	13	Baggage, Permit cargo
<i>Disonycha</i> sp.	Dominican Republic, Mexico	2	Baggage, Permit cargo
<i>Dothiorella gregaria</i>	Mexico	1	Baggage
<i>Drosophilidae</i> , species of	El Salvador, Ghana, Hawaii, Jamaica, Mexico, St. kitts and Nevis, Sri Lanka, Unknown	32	Baggage
<i>Drymaeus</i> sp.	Mexico	3	Baggage
<i>Dyscinetus</i> sp.	Mexico	1	Permit cargo
<i>Dysdercus andreae</i>	Dominican Republic	2	Baggage, Permit cargo
<i>Dysmicoccus brevipes</i>	Grenada, Jamaica, Mexico, Dominican Republic	7	Baggage, Permit cargo
<i>Dysmicoccus neobrevipes</i>	Dominican Republic	1	Permit cargo
<i>Dysmicoccus</i> sp.	Dominican Republic, Jamaica, Mexico	6	Baggage, Permit cargo
<i>Eburria fisheri</i>	Dominican Republic	1	Permit cargo
<i>Ecdytolopha</i> sp.	El Salvador	1	Baggage
<i>Ectatoderus</i> sp.	Dominican Republic	1	Permit cargo
<i>Elachistidae</i> species of	El Salvador	1	Baggage
<i>Elateridae</i> , species of	Chile, Dominican Republic	2	Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Elsinoe mangiferae</i>	Bolivia, Brazil	2	Baggage , Stores
<i>Empoasca</i> sp.	Mexico	1	Baggage
<i>Endomychidae</i> species of	Dominican Republic	1	Permit cargo
<i>Entomobryidae</i> species of	Cuba, Dominican Republic, Jamaica, Mexico	4	Baggage
<i>Eotetranychus</i> sp.	El Salvador	1	Baggage
<i>Ephestia elutella</i>	Dominican Republic, Mexico	2	Baggage, Permit cargo
<i>Eriococcus</i> sp.	Mexico	1	Baggage
<i>Estigmene</i> sp.	Mexico	1	Permit cargo
<i>Etiella zinckenella</i>	Mexico	1	Baggage
<i>Euarestoides acutangulus</i>	Mexico	1	Baggage
<i>Eucalymantus tessellatus</i>	Mexico	1	Baggage
<i>Euparius subtesselatus</i>	Mexico	1	Baggage
<i>Euphoria leucographa</i>	Mexico	1	Permit cargo
<i>Euchistus crenator</i>	Dominican Republic	1	Permit cargo
<i>Falconia</i> sp.	Mexico	1	Baggage
<i>Ferrisia</i> sp.	Mexico	2	Baggage
<i>Ferrisia virgata</i>	El Salvador, Mexico, Dominican Republic	5	Baggage
<i>Fiorinia fioriniae</i>	Bolivia, Dominican Republic, El Salvador, Mexico, Peru, Trinidad and Tobago	28	Baggage, Mail, Permit cargo, Quarters,
<i>Fiorinia</i> sp.	Jamaica, Mexico, Peru, Trinidad and Tobago, Unknown	8	Baggage
<i>Forficulidae</i> , species of	Hawaii	1	Baggage
<i>Frankliniella cestrum</i>	Chile	1	Permit cargo
<i>Frankliniella gossypiana</i>	Mexico	1	Baggage
<i>Frankliniella occidentalis</i>	Mexico	1	Baggage
<i>Frankliniella</i> sp.	Dominican Republic, Mexico	3	Baggage, Permit cargo
<i>Franklinothrips vespiformis</i>	Mexico	1	Baggage
<i>Fulgoridae</i> , species of	Mexico, Philippines	2	Baggage
<i>Fulvius</i> sp.	Mexico	1	Miscellaneous
<i>Fungitarsonemus</i> sp.	El Salvador	1	Baggage
<i>Fusarium</i> sp.	El Salvador, Mexico, Guatemala, Jamaica, South Africa	5	Baggage
<i>Fuscuropoda</i> sp.	Jamaica	1	Baggage
<i>Fusicoccum luteum</i>	New Zealand	1	Mail
<i>Fusicoccum</i> sp.	Mexico, Peru	8	Baggage
<i>Galumnidae</i> , species of	Mexico	1	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Gelechiidae</i> , species of	Bolivia, Chile, Colombia, El Salvador, Guatemala, Honduras, Mexico, Netherlands, Nigeria, Philippines, Unknown	24	Baggage, Permit cargo
<i>Gelechiinae</i> , species of	Mexico	2	Baggage
<i>Geometridae</i> , species of	Chile, Mexico	2	Baggage, Permit cargo
<i>Geotrichum</i> sp.	Mexico	1	Baggage
<i>Globodera rostochiensis</i>	Spain	1	Permit cargo
<i>Glomerella</i> sp.	Australia, Mexico	3	Baggage
<i>Gnathotrichus denticulatus</i>	Mexico	1	Baggage
<i>Gnathotrichus</i> sp.	Mexico	8	Baggage
<i>Grammophorus minor</i>	Chile	1	Permit cargo
<i>Granodomus lima</i>	Puerto Rico	1	Baggage
<i>Grapholita</i> sp.	Mexico	3	Baggage
<i>Greenidea</i> sp.	Mexico	2	Baggage, Permit cargo
<i>Gryllidae</i> , species of	Dominican Republic	8	Permit cargo
<i>Grylodes sigillatus</i>	Dominican Republic	1	General cargo
<i>Gryllus</i> sp.	Chile, Dominican Republic, Mexico	8	Permit cargo, Miscellaneous
<i>Guignardia</i> sp.	Mexico	1	Baggage
<i>Gynaikothrips ficorum</i>	Honduras	1	Baggage
<i>Hadeninae</i> , species of	Chile	16	Permit cargo
<i>Heilipodus</i> sp.	Mexico	1	Baggage
<i>Heilipus</i> sp.	Colombia, Costa Rica, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Peru, Venezuela	72	Baggage, General cargo
<i>Heleomyzidae</i> species of	Dominican Republic	3	Permit cargo
<i>Helicoverpa</i> sp.	Jamaica	1	Baggage
<i>Heliothinae</i> , species of	Chile	1	Permit cargo
<i>Heliothrips haemorrhoidalis</i>	South Africa, Mexico	3	Baggage, Permit cargo
<i>Hemiberlesia diffinis</i>	Ecuador, Guatemala, Mexico, Peru, South Africa	17	Baggage, stores

Pest	Origin	Interceptions (no.)	Where found
<i>Hemiberlesia lataniae</i>	Argentina, Australia, Canary islands, Chile, China, Costa Rica, Colombia, Dominican Republic, Ecuador, France, Gibraltar, Hawaii, Israel, Jamaica, Guatemala, Macao, Mexico, Nicaragua, New Zealand, Peru, South Africa, Spain, United Arab Emirates, United Kingdom, Unknown, St. Vincent and the Grenadines	843	Baggage, General cargo, Mail, Permit cargo, Quarters, Stores
<i>Hemiberlesia neodiffinis</i>	Mexico	1	Baggage, Mail
<i>Hemiberlesia palmae</i>	Antigua and Bermuda, Philippines	4	Baggage
<i>Hemiberlesia rapax</i>	Chile, India, Mexico, Peru	18	Baggage, Permit cargo, General cargo
<i>Hemiberlesia</i> sp.	Argentina, Brazil, Chile, Costa Rica, Dominican Republic, India, Mexico, Peru, Unknown	40	Baggage, Permit cargo, Stores
<i>Hemiceras</i> sp.	Dominican Republic	1	Permit cargo
<i>Hemiptera</i> species of	Mexico	1	Baggage
<i>Hemisphaeriales</i> species of	Honduras, Mexico	2	Baggage
<i>Hendersonia</i> sp.	Mexico	1	Baggage
<i>Hendersoniopsis</i> sp.	Mexico	1	Baggage
<i>Hendersonula australis</i>	Panama	1	Baggage
<i>Hesperiidae</i> , species of	Guatemala, Mexico	8	Baggage
<i>Heteroptera</i> , species of	Mexico	9	Baggage, Mail
<i>Homoptera</i> , species of	Colombia, Dominica, Dominican Republic, Honduras, Mexico, Puerto Rico	29	Baggage, Permit cargo
<i>Hoplolaimidae</i> species of	India	1	Baggage
<i>Hoplandrothrips</i> sp.	Mexico	1	Baggage
<i>Hoplosphyrum griseus</i>	Chile	9	Permit cargo
<i>Hydrozetidae</i> , species of	Sri Lanka	1	Baggage
<i>Hygromiidae</i> species of	Greece	1	Baggage
<i>Hylurgus ligniperda</i>	Chile, New Zealand	2	Permit cargo
<i>Hymenoptera</i> , species of	Mexico, Panama, Trinidad and Tobago	5	Baggage
<i>Hypera</i> sp.	Mexico	1	Baggage
<i>Hyperodes</i> sp.	Mexico	1	Baggage
<i>Icerya aegyptiaca</i>	Ghana	1	Baggage
<i>Jadera coturniz</i>	Mexico	1	Permit cargo
<i>Jadera haematoloma</i>	Dominican Republic	1	Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Karnyothrips flavipes</i>	Mexico	2	Baggage
<i>Kilifia acuminata</i>	Mexico	5	Baggage
<i>Kilifia americana</i>	Mexico	1	Baggage
<i>Lacinipolia</i> sp.	Dominican Republic	1	Permit cargo
<i>Lagriinae</i> , species of	Mexico	1	Baggage
<i>Largus succintus</i>	Mexico	1	Baggage
<i>Lasiodiplodia</i> sp.	Dominican Republic, Mexico	2	Baggage, Permit cargo
<i>Lasius</i> sp.	Taiwan	1	Baggage
<i>Ledrinae</i> species of	Philippines	1	Baggage
<i>Leioscyta</i> sp.	Mexico	1	Baggage
<i>Lepidoptera</i> , species of	Belize, Chile, Dominican Republic, Jamaica, Mexico, Nigeria, Peru, Unknown	29	Baggage, Permit cargo, stores
<i>Lepidosaphes</i> sp.	Chile, Nigeria	3	Baggage
<i>Lepidosaphes tapleyi</i>	Guinea	1	Baggage
<i>Leptodothiorella</i> sp.	Mexico	2	Baggage, Mail
<i>Leptopharsa</i> sp.	Mexico	1	Baggage
<i>Leptosphaeria</i> sp.	Mexico	1	Baggage
<i>Leptostromella</i> sp.	Mexico	1	Baggage
<i>Leptostylus</i> sp.	Dominican Republic	1	Permit cargo
<i>Leptothrips</i> sp.	Guatemala, Mexico	4	Baggage
<i>Leucaspis</i> sp.	Mexico	1	Baggage
<i>Leucinodes orbonalis</i>	Nigeria	1	Baggage
<i>Levicepolis monodonta</i>	Dominican Republic	2	Permit cargo
<i>Lichen</i> sp.	Mexico, Trinidad and Tobago	10	Baggage, Mail
<i>Ligyrocoris</i> sp.	Mexico	1	Baggage
<i>Ligyryus</i> sp.	Mexico	2	Permit cargo
<i>Limacodidae</i> , species of	Mexico	4	Baggage
<i>Linochora</i> sp.	Mexico	12	Baggage, Permit cargo
<i>Liorhyssus hyalinus</i>	Mexico	1	Baggage
<i>Liothrips</i> sp.	Mexico	3	Baggage
<i>Lithraeus egenus</i>	Chile	2	Permit cargo
<i>Lobometopon metallicum</i>	Mexico	1	Baggage
<i>Lonchaeidae</i> , species of	El Salvador, Trinidad and Tobago, Nigeria	6	Baggage
<i>Longitarsus</i> sp.	Mexico	1	Baggage
<i>Lopholeucaspis cockerelli</i>	Dominican Republic, Jamaica	6	Baggage
<i>Lorryia formosa</i>	Dominican Republic, Mexico	2	Baggage, Permit cargo
<i>Lorryia</i> sp.	Dominican Republic, Mexico	3	Baggage, Permit cargo
<i>Luperosoma</i> sp.	Mexico	1	Permit cargo
<i>Lygaeidae</i> , species of	Mexico	3	Baggage
<i>Lygaeoidea</i> , species of	Guatemala, Mexico	2	Baggage
<i>Lygus</i> sp.	Mexico	1	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Lymantriidae</i> , species of	Mexico	2	Baggage
<i>Lyonetiidae</i> , species of	El Salvador	1	Baggage
<i>Maconellicoccus hirsutus</i>	Unknown	1	Baggage
<i>Macronyssidae</i> , species of	Mexico	1	Baggage
<i>Macrosiphum euphorbiae</i>	Mexico	1	Baggage
<i>Margarodidae</i> , species of	Hawaii, Honduras, Ghana, Mexico	4	Baggage, Mail
<i>Marmara</i> sp.	Mexico	3	Baggage
<i>Melanaethus</i> sp.	Mexico	1	Baggage
<i>Melanaspis</i> sp.	Mexico, Venezuela	4	Baggage, Mail, Stores
<i>Melanconium</i> sp.	Mexico	1	Baggage
<i>Membracidae</i> , species of	Mexico	8	Baggage
<i>Mesostigmata</i> , species of	Dominica, Mexico, Panama, Peru	5	Baggage, Permit cargo
<i>Metamasius</i> sp.	Mexico	1	Baggage
<i>Metaspidiotus stauntoniae</i>	Asia Country, Unknown	1	Baggage
<i>Metcalfiella monogramma</i>	Guatemala, Honduras, Mexico	11	Baggage, Mail
<i>Mezira</i> sp.	Dominican Republic	1	Permit cargo
<i>Micrapate scabrata</i>	Chile	1	Permit cargo
<i>Micrapate</i> sp.	Mexico	1	Baggage
<i>Microgryllus pallipes</i>	Chile	6	Permit cargo
<i>Microsphaeropsis</i> sp.	Costa Rica, Ecuador, El Salvador, Mexico, Unknown	18	Baggage
<i>Milichiidae</i> , species of	Mexico	1	Baggage
<i>Milviscutulus mangiferae</i>	Mexico	5	Baggage
<i>Miridae</i> , species of	Cuba, Guatemala, Haiti, Mexico, Philippines, Unknown	38	Baggage, Mail, Permit cargo
<i>Mollusca</i> , species of	Mexico	1	Baggage
<i>Monochaetia</i> sp.	Mexico	3	Baggage
<i>Monochaetinula</i> sp.	Mexico, Ecuador	2	Baggage
<i>Monochaetinula terminaliae</i>	Mexico	2	Baggage
<i>Muscidae</i> , species of	Hawaii, El Salvador	2	Baggage
<i>Mycetaspis personata</i>	Mexico, Unknown	31	Baggage
<i>Mycetaspis</i> sp.	Mexico	8	Baggage
<i>Mycetaspis sphaeroides</i>	Mexico	1	Baggage
<i>Mycetophagidae</i> , species of	Mexico	2	Baggage
<i>Mycosphaerella persica</i>	Mexico	1	Baggage
<i>Mycosphaerella</i> sp.	Mexico	4	Baggage, General cargo, Permit cargo
<i>Myochrous</i> sp.	Mexico	2	Permit cargo
<i>Myrmicinae</i> , species of	Dominican Republic	2	Permit cargo
<i>Nabidae</i> , species of	Mexico	1	Baggage
<i>Naupactus</i> sp.	Dominican Republic	1	Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Neoconocephalus affinis</i>	Dominican Republic	1	Permit cargo
<i>Nessothrips</i> sp.	Haiti	1	Baggage
<i>Neuroptera</i> species of	Mexico	1	Baggage
<i>Nezara viridula</i>	Dominican Republic	1	Permit cargo
<i>Nipaecoccus jonmartini</i>	Mexico	1	Baggage
<i>Nipaecoccus nipae</i>	Mexico, Puerto Rico	17	Baggage
<i>Nipaecoccus</i> sp.	Mexico, Trinidad and Tobago	7	Baggage
<i>Nitidulidae</i> , species of	Dominican Republic, Hawaii, Mexico, Vietn Nam	7	Baggage, Permit cargo
Noctuidae, species of	Dominican Republic, El Salvador, Chile, Mexico, Nigeria	20	Baggage, Permit cargo
Nolidae, species of	Mexico	2	Baggage
<i>Nomophila</i> sp.	Chile	2	Permit cargo
<i>Nymphalidae</i> , species of	Mexico	1	Baggage
<i>Nysius</i> sp.	Chile, Mexico	3	Baggage, Permit cargo
<i>Oceanaspidiotus spinosus</i>	Dominican Republic	1	Permit cargo
<i>Oecophoridae</i> species of	Chile, El Salvador, Guatemala, Honduras, Mexico, Peru, Kenya, India	16	Baggage, Permit cargo
<i>Ogdoecosta</i> sp.	Mexico	1	Baggage
<i>Olethreutinae</i> , species of	Antigua and Barbuda, Cote D'Ivoire, El Salvador, Mexico, Unknown, Nigeria	16	Baggage
<i>Oligonychus</i> sp.	Mexico	2	Baggage
<i>Oncometopia</i> sp.	Dominican Republic	1	Permit cargo
<i>Oribatei</i> , species of	Dominican Republic	1	Permit cargo
<i>Oribatida</i> , species of	Dominican Republic, Mexico	6	Baggage, Permit cargo
<i>Orius</i> sp.	Mexico	1	Baggage
<i>Oryzaphilus surinamensis</i>	Mexico	1	Baggage
<i>Otitidae</i> , species of	Colombia, Dominican Republic, Guatemala, Hawaii, Honduras, Mexico	12	Baggage, Permit cargo
<i>Pachybrachius</i> sp.	Mexico	1	Permit cargo
<i>Pagiocerus frontalis</i>	Mexico, Peru	2	Baggage
<i>Palinaspis</i> sp.	Ecuador	11	Baggage
<i>Pantomorus</i> sp.	Mexico	1	Baggage
<i>Papilionidae</i> , species of	Mexico	2	Baggage
<i>Paracoccus marginatus</i>	Barbados, Puerto Rico	2	Baggage
<i>Paracoccus</i> sp.	Dominican Republic	2	Baggage, Permit cargo
<i>Paraleyrodes minei</i>	Mexico	7	Baggage, Mail
<i>Paraleyrodes perseae</i>	Mexico	1	Baggage
<i>Paraleyrodes</i> sp.	Antigua and Barbuda, Mexico	8	Baggage, General cargo, Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Parapiesma cinereum</i>	Mexico	1	Baggage
<i>Parasaissetia nigra</i>	Mexico	2	Baggage, Permit cargo
<i>Paratrechina longicornis</i>	Dominican Republic, Mexico	2	Baggage, Permit cargo
<i>Paratrechina</i> sp.	Mexico	1	Baggage
<i>Parlatoria cinerea</i>	United Kingdom of Great Britain and N. Ireland	1	Baggage
<i>Parlatoria citri</i>	Thailand	1	Baggage
<i>Parlatoria</i> sp.	Mexico	1	Baggage
<i>Penicillium</i> sp.	Peru, Unknown	2	Baggage, Stores
<i>Pentatomidae</i> , species of	Dominican Republic, El Salvador, Jamaica, Mexico, Peru	7	Baggage
<i>Periconiella</i> sp.	Mexico	4	Baggage, General cargo
<i>Perizomella</i> sp.	Mexico	1	Permit cargo
<i>Pestalotia</i> sp.	Mexico	2	Baggage
<i>Pestalotiopsis adusta</i>	Mexico	1	Permit cargo
<i>Pestalotiopsis mangiferae</i>	Mexico	1	Baggage
<i>Pestalotiopsis</i> sp.	Belize, Brazil, Cameroon, Costa Rica, Dominican Republic, El Salvador, Jamaica, Mexico, Trinidad and Tobago, Unknown	29	Baggage, General cargo, Permit cargo, Stores
<i>Pestalotiopsis versicolor</i>	Dominican Republic, Mexico	2	Baggage, Permit cargo
<i>Phaedon</i> sp.	Mexico	1	Miscellaneous
<i>Phaeoseptoria</i> sp.	Ecuador, Mexico	2	Baggage
<i>Phaeosphaeria</i> sp.	Mexico	1	Baggage
<i>Pheidole</i> sp.	Mexico	2	Baggage
<i>Phenacoccus solenopsis</i>	Mexico	1	Baggage
<i>Phenacoccus</i> sp.	Viet Nam	1	Baggage
<i>Philotricha erigens</i>	Mexico	1	Baggage
<i>Philephedra lutea</i>	Mexico	1	Baggage
<i>Phlaeothripidae</i> , species of	Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, New Zealand, Panama	36	Baggage, Permit cargo, Stores
<i>Phoma</i> sp.	Argentina, Ecuador, Guatemala, India, Jamaica, Mexico, Italy	73	Baggage, General cargo, Mail, Miscellaneous
<i>Phomopsis</i> sp.	Argentina, Brazil, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Jamaica, Mexico, Peru, Unknown	46	Baggage, General cargo, Permit cargo, stores
<i>Phoridae</i> , species of	Dominican Republic, Hawaii	2	Baggage, Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Phycitinae</i> , species of	Peru, Mexico	4	Baggage
<i>Phyllachora gratissima</i>	Mexico, Nicaragua	112	Baggage, General cargo, Mail, Permit cargo
<i>Phyllachora</i> sp.	Mexico	4	Baggage
<i>Phyllocnistis</i> sp.	Mexico	9	Baggage
<i>Phyllophaga</i> sp.	Mexico, Dominican Republic	8	Baggage, Permit cargo
<i>Phyllosticta</i> sp.	Ecuador, Greece, Mexico, Viet Nam	10	Baggage, General cargo, Mail, Permit cargo
<i>Physorhinus</i> sp.	Mexico	1	Permit cargo
<i>Phytocoris</i> sp.	Chile	1	Permit cargo
<i>Phytoseiidae</i> , species of	Mexico	12	Baggage
<i>Pinnaspis aspidistrae</i>	Mexico, Peru	6	Baggage
<i>Pinnaspis</i> sp.	Peru	5	Baggage
<i>Pinnaspis strachani</i>	Dominican Republic, Mexico, Peru	4	Baggage
<i>Pityophthorus</i> sp.	Mexico	2	Baggage, Permit cargo
<i>Planococcus citri</i>	Mexico	1	Baggage
<i>Planococcus halli</i>	Mexico	1	Permit cargo
<i>Planococcus minor</i>	Philippines, Puerto Rico	2	Baggage
<i>Planococcus</i> sp.	Ghana, Nicaragua	2	Baggage
<i>Platynota rostrana</i>	Mexico	1	Baggage
<i>Platynota</i> sp.	Dominican Republic, Haiti, Mexico	7	Baggage, Mail, Permit cargo
<i>Pleurophoma</i> sp.	Mexico	1	Baggage
<i>Plodia interpunctella</i>	Mexico	1	Baggage
<i>Podisus</i> sp.	Mexico	1	Baggage
<i>Polymerus</i> sp.	Mexico	1	Baggage
<i>Prosapia bicincta</i>	Dominican Republic	1	Baggage
<i>Prosapia</i> sp.	Dominican Republic, Mexico	2	Permit cargo
<i>Prostephanus truncatus</i>	Mexico	1	Baggage
<i>Protopulvinaria longivalvata</i>	Puerto Rico	1	Baggage
<i>Protopulvinaria pyriformis</i>	Mexico, Peru	3	Baggage
<i>Prytanus</i> sp.	Mexico	1	Baggage
<i>Pseudacysta perseae</i>	Haiti, Jamaica, Mexico, Puerto Rico	39	Baggage
<i>Pseudaletia impuncta</i>	Chile	3	Permit cargo
<i>Pseudaletia</i> sp.	Chile	1	Permit cargo
<i>Pseudaonidia trilobitiformis</i>	Bolivia, Colombia, Cuba, Dominican Republic, Ecuador, Guyana, Haiti, Honduras, Jamaica, Mexico, Nigeria, Peru, Puerto Rico, South Africa, St. Kitts and Nevis, Uganda, Venezuela	75	Baggage, Permit cargo, Stores

Pest	Origin	Interceptions (no.)	Where found
<i>Pseudischinaspis bowreyi</i>	Guatemala, Mexico	5	Baggage
<i>Pseudocercospora purpurea</i>	Brazil, Colombia, Dominican Republic, Guatemala, Guinea, Honduras, Jamaica, Mexico, Nigeria	33	Baggage, stores
<i>Pseudocercospora</i> sp.	France, Jamaica, Mexico	6	Baggage
<i>Pseudococcidae</i> , species of	Australia, Bahamas, Brazil, Chile, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Jamaica, Mexico, Peru, Philippines, Puerto Rico, St. Kitts and Nevis, Trinidad and Tobago, Unknown, US Virgin Islands, Venezuela, Viet Nam	349	Baggage, General cargo, Permit cargo, Mail
<i>Pseudococcus jacekbeardsleyi</i>	Mexico	1	Permit cargo
<i>Pseudococcus longispinus</i>	New Zealand, Mexico, South Africa, Chile	6	Baggage, Permit cargo
<i>Pseudococcus</i> sp.	Chile, Dominican Republic, Jamaica, Guatemala, Mexico, Trinidad and Tobago	104	Baggage, Permit cargo, Mail
<i>Pseudomonas syringae</i>	Mexico	2	Baggage
<i>Pseudopachybrachyuz basalis</i>	Mexico	1	Permit cargo
<i>Pseudoparlatoria parlatorioides</i>	Mexico	1	Baggage
<i>Pseudoparlatoria perparvula</i>	Mexico	5	Baggage
<i>Pseudoparlatoria</i> sp.	Mexico	1	Baggage
<i>Pseudopityophthorus</i> sp.	Mexico	1	Baggage
<i>Psilidae</i> , species of	Mexico	2	Baggage
<i>Psocidae</i> , species of	Dominican	1	Permit cargo
<i>Psocoptera</i> , species of	Guatemala, Mexico, Trinidad, and Tobago, Unknown	16	Baggage
<i>Psychidae</i> , species of	Mexico	1	Baggage
<i>Psychodidae</i> , species of	Dominican Republic	2	Permit cargo
<i>Psylla</i> sp.	Mexico	1	Baggage
<i>Psyllidae</i> , species of	Asia Country Unknown, El Salvador, Guatemala, Mexico	106	Baggage, Mail, Permit cargo
<i>Psylloidea</i> , species of	Mexico	3	Baggage
<i>Pulvinaria psidii</i>	Mexico, Philippines	3	Baggage
<i>Pulvinaria</i> sp.	Mexico	1	Baggage
<i>Pupisoma dioscoricola</i>	Mexico	1	Baggage
<i>Puto mexicanus</i>	Mexico	4	Baggage
<i>Puto</i> sp.	Mexico	5	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Pyralidae</i> , species of	Jamaica, Mexico, Nicaragua, Philippines	8	Baggage, Permit cargo
<i>Pyraustinae</i> , species of	Chile, Mexico, Puerto Rico	3	Baggage, Permit cargo
<i>Pyrenochaeta</i> sp.	Mexico	1	Baggage
<i>Pyrginae</i> , species of	Mexico	1	Baggage
<i>Pirgocorypha</i> sp.	Dominican Republic	1	Permit cargo
<i>Pyrrhopyge chalybea</i>	Mexico	1	Baggage
<i>Quadraspidotus perniciosus</i>	Ecuador, Mexico	2	Baggage
<i>Quadraspidotus</i> sp.	Mexico	8814	Baggage, Permit cargo, General cargo, Miscellaneous, Stores
<i>Raoiella indica</i>	Dominican Republic	2	Permit cargo
<i>Reduviidae</i> , species of	Mexico	1	Baggage
<i>Rhinoclaadiella</i> sp.	Mexico	1	Baggage
<i>Rhizoctonia</i> sp.	Trinidad and Tobago	1	Baggage
<i>Rhizophagidae</i> species of	Mexico	1	Baggage
<i>Rhizopus</i> sp.	Uganda	1	Baggage
<i>Rhyephenes</i> sp.	Chile	1	Permit cargo
<i>Rhyarochromidae</i> , species of	Greece, Mexico	2	Baggage
<i>Rhyzopertha dominica</i>	Dominican Republic	2	Permit cargo
<i>Saissetia coffeae</i>	Mexico	1	Baggage
<i>Saissetia neglectea</i>	St. Lucia	1	Permit cargo
<i>Saissetia</i> sp.	Honduras, Mexico	1	Baggage
<i>Salticidae</i> , species of	Mexico	1	Baggage
<i>Saturniidae</i> , species of	Mexico, Jamaica	8	Baggage, General cargo
<i>Scarinae</i> , species of	Mexico	2	Baggage
<i>Scelionidae</i> , species of	El Salvador	1	Baggage
<i>Schelorbitatidae</i> , species of	Mexico	1	Baggage
<i>Scholastes</i> sp.	Hawaii	1	Baggage
	Mexico	2	Baggage
<i>Scirtothrips</i> sp.			
<i>Scudderia</i> sp.	Dominican Republic	1	Permit cargo
<i>Scutellonema brachyurus</i>	Mexico	1	Baggage
<i>Scutellonema bradys</i>	Gabon	1	Baggage
<i>Selenaspidus articulatus</i>	Dominican Republic, Guatemala, Mexico, Nigeria South Africa	11	Baggage, Quarters
<i>Selenophoma</i> sp.	Mexico	2	Baggage
<i>Selenothrips rubrocinctus</i>	Mexico	1	Baggage
<i>Septoria</i> sp.	Dominican Republic, Mexico	20	Baggage, Mail, Permit cargo
<i>Singhiella sitrifolii</i>	Guatemala, Mexico	2	Baggage
<i>Sitona</i> sp.	Chile	1	Permit cargo
<i>Sitophilus</i> sp.	Mexico, Nicaragua	7	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Solenopsis invicta</i>	Puerto Rico	1	Baggage
<i>Solenopsis sp.</i>	Mexico	1	Baggage
<i>Sonchu soleraceus</i>	Mexico	1	Baggage
<i>Sphaceloma mangifera</i>	Argentina	1	Baggage
<i>Sphaceloma perseae</i>	Argentina, Australia, Bahamas, Belize, Brazil, Burundi, Cameroon, Canada, Cayman Islands, Chile, China, Colombia, Costa Rica, Cote D'Ivoire, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Germani, Ghana, Grece, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Hong Kong, India, Israel, Jamaica, Jordan, Kenya, Lebanon, Mexico, New Zealand, Nicaragua, Nigeria, Panama, Peru, Philippines, Portugal, Senegal, Sierra Leon, South Africa, Sri Lanca, St. Lucia, Suriname, Trinidad and Tobago, Uganda, United Kingdom of Great Britain and N. Ireland, Unknown, US Virgin Islands, Venezuela, Viet Nam, Zimbabwe	1025	Baggage, General cargo, Mail, Miscellaneous, Permit cargo, Stores
<i>Sphaceloma psidii</i>	Mexico	1	Permit cargo,
<i>Sphaceloma punicae</i>	Mexico	3	Baggage
<i>Sphaceloma sp.</i>	Brazil, Hawaii, Peru, Spain, Cuba	5	Baggage, stores
<u><i>Sphaeropsidales species of</i></u>	Mexico	1	Baggage
<i>Sphaeropsis sp.</i>	Mexico	5	Baggage
<i>Sphenophorus venatus</i>	Mexico	1	Baggage
<i>Sphingidae, species of</i>	Mexico, Ecuador	3	Baggage
<i>Spodoptera Frugiperda</i>	Mexico	1	Baggage
<i>Spodoptera Latifascia</i>	Dominican Republic	1	Permit cargo
<i>Spodoptera sp.</i>	Mexico	1	Baggage
<i>Stagonospora sp.</i>	Mexico	1	Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Stenoma catenifer</i>	Belize, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Peru, St. Lucia, Trinidad and Tobago, Unknown, Venezuela	447	Baggage, Mail, Quarters, Stores
<i>Stenoma</i> sp.	El Salvador, Nicaragua	3	Baggage
<i>Stenopelmatus</i> sp.	Mexico	1	Baggage
<i>Sternochetus mangiferae</i>	French Polynesia	1	Baggage
<i>Stictococcus intermedius</i>	Cameroon	1	Baggage
<i>Stigmaeidae, species of</i>	Mexico, Dominican Republic	3	Baggage, Permit cargo
<i>Stigmaeus</i> sp.	Mexico, Dominican Republic	4	Baggage, Permit cargo
<i>Syrphidae, species of</i>	Dominican Republic, Ecuador	2	Permit cargo
<i>Tarachidia flavibasis</i>	Dominican Republic	1	Permit cargo
<i>Tarsonemus confusus</i>	Ecuador	1	Baggage
<i>Tarsonemus</i> sp.	Dominican Republic, Israel, Mexico, South Africa	16	Baggage, Permit cargo
<i>Tenebrionidae, species of</i>	Chile, Dominican Republic	3	Permit cargo, General cargo
<i>Tenuipalpus</i> sp.	Dominican Republic	1	Permit cargo
<i>Tephritidae, species of</i>	Hawaii, Uganda	244	Baggage
<i>Tetraleurodes mori</i>	Mexico	113	Baggage, Mail
<i>Tetraleurodes perseae</i>	Mexico	36	Baggage, Permit cargo
<i>Tetraleurodes quadratus</i>	Mexico	2	Baggage
<i>Tetraleurodes</i> sp.	India, Jamaica, Mexico, Panama, Unknown	386	Baggage, Permit cargo, Mail
<i>Tetraleurodes Ursorum</i>	Mexico	1	Baggage
<i>Tetralicia</i> sp.	Mexico	166	Baggage, Permit cargo, Stores
<i>Tetranychus</i> sp.	Mexico, Philippines	20	Baggage
<i>Tettigoniidae, species of</i>	Dominican Republic, Mexico, Suriname	6	Baggage, Permit cargo, Mail
<i>Thaumatotibia</i> sp.	Ghana	1	Baggage
<i>Thioptera nigrofimbria</i>	Dominican Republic	1	Permit cargo
<i>Thripidae, species of</i>	Costa Rica, Mexico, Dominican Republic, Peru	13	Baggage, Permit cargo
<i>Thysanoflorinia Nephelli</i>	Unknown	1	Baggage
<i>Thysanoptera, species of</i>	Dominican Republic, Mexico	5	Baggage, Permit cargo
<i>Tineidae, species of</i>	Dominican Republic, Hawaii	2	Permit cargo, Baggage
<i>Tingidae, species of</i>	Dominican Republic, Haiti, Mexico, Panama, Puerto Rico	8	Baggage, Permit cargo, Mail
<i>Tischeridae, species of</i>	Mexico	1	Baggage
<i>Tomarus</i> sp.	Dominican Republic	2	Permit cargo

Pest	Origin	Interceptions (no.)	Where found
<i>Tomarus villosus burmeister</i>	Chile	6	Permit cargo
<i>Tortricidae</i> , species of	Cameroon, Dominican Republic, El Salvador, Greece, Hawaii, Mexico, Guatemala, Philippines	32	Baggage, Permit cargo Mail
<i>Tortricinae</i> , species of	Chile, Mexico	16	Baggage, Permit cargo
<i>Toxoptera Aurantii</i>	Mexico	2	Baggage
<i>Toxoptera sp.</i>	Mexico	1	Baggage
<i>Trialeurodes abutilonea</i>	Mexico	1	Baggage
<i>Trialeurodes floridensis</i>	Mexico, Puerto Rico	31	Baggage
<i>Trialeurodes similis</i>	Mexico	3	Baggage
<i>Trialeurodes sp.</i>	Barbados, Costa Rica, Guyana, Mexico	99	Baggage, Mail, Permit cargo, Stores
<i>Trialeurodes vaporariorum</i>	Mexico	4	Baggage
<i>Trialeurodes Bariabilis</i>	Mexico	1	Baggage
<i>Trialeurodes Vitrinellus</i>	Mexico	2	Baggage
<i>Trichapion Aurichalceum</i>	Mexico	1	Baggage
<i>Trichapion Godmani</i>	Mexico	1	Baggage
<i>Trichoplusia Ni</i>	Mexico	1	Permit cargo
<i>Trichothecium roseum</i>	Mexico	1	Baggage
<i>Tridax Procumbens</i>	Mexico	1	Baggage
<i>Trimmatostroma sp.</i>	Mexico	1	Baggage
<i>Trioza anceps Tuthill</i>	Mexico	602	Baggage, Permit cargo, General cargo, Mail
<i>Trioza sp.</i>	Guatemala, Mexico, Unknown	81	Baggage, General cargo, Mail, Permit cargo,
<i>Trioziidae</i> , species of	Guatemala, Honduras, Mexico	66	Baggage, General cargo, Mail, Permit cargo
<i>Tropidosteptes sp.</i>	Mexico	1	Baggage
<i>Truncatella sp.</i>	Mexico	1	Baggage
<i>Tuckerella knorri</i>	Dominican Republic	1	Permit cargo
<i>Tuckerella Ornata</i>	Dominican Republic	3	Permit cargo
<i>Tuckerella pavoniformis</i>	Dominican Republic, Netherlands, Peru	30	Baggage, General cargo, Permit cargo,
<i>Tuckerella sp.</i>	Dominican Republic	4	Baggage, Permit cargo
<i>Tydeidae</i> , species of	Dominican Republic, Jamaica, Mexico, Unknown	9	Baggage, Permit cargo
<i>Tyloderma sp.</i>	Dominican Republic	1	Permit cargo
<i>Ytpha sp-</i>	Mexico	1	Baggage
<i>Typhlocybinae</i> , species of	Mexico	3	Baggage
<i>Tyrophagus sp.</i>	Mexico	1	Baggage
<i>Unaspis citri</i>	Dominican Republic, Ecuador	2	Baggage
<i>Utetheisa sp.</i>	Dominican Republic	1	Permit cargo
<i>Verticillium sp.</i>	Mexico	1	Baggage

Pest	Origin	Interceptions (no.)	Where found
<i>Vinsonia stellifera</i>	Antigua and Barbuda, Colombia, Unknown	3	Baggage
<i>Xyleborus intrusus</i>	Mexico	1	Permit cargo
<i>Zabrotes subfasciatus</i>	Mexico	2	Baggage
<i>Zopheridae</i> , species of	Dominican Republic	1	Permit cargo
<i>Zygopinae</i> , species of	Mexico	190	Baggage
<i>Zygosporium</i> sp.	Mexico	2	Baggage

Appendix F. Pests reported on avocado, *Persea Americana*, and present in Colombia

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
ARTHROPODS				
ARACHNIDA				
<i>Allonychus braziliensis</i> McGregor	Acari: Tetranychidae	Bolland et al., 1998; Guerrero and Bellotti, 1980; Migeon and Dorkeld, 2010	CO (Posada, 1989)	L (Guerrero and Bellotti, 1980; Jeppson et al., 1975; Posada, 1989)
<i>Mononychellus planki</i> McGregor	Acari: Tetranychidae	Bernal and Diaz., 2006; Posada, 1989	CO (Bolland et al., 1998; Fazzio et al., 2005; Jeppson et al., 1975; Posada, 1989; Urueta, 1975a; Zuluaga, 1980); US(Bolland et al., 1998; Fazzio et al., 2005)	L (Meneghin et al., 2011)
<i>Oligonychus mangiferus</i> (Rahman and Sapra) Pritchard and Baker	Acari: Tetranychidae	Bolland et al., 1998; CABI, 2010; Migeon and Dorkeld. 2010., 2010	CO (Posada, 1989); US (HI) (Jeppson et al., 1975)	L (Hill, 1983; Jeppson et al., 1975)
<i>Oligonychus mcgregori</i> Baker and Pritchard	Acari: Tetranychidae	Bolland et al., 1998; Migeon and Dorkeld. 2010., 2010	CO (Bolland et al., 1998; Posada, 1989; Urueta, 1975a)	L (Posada, 1989)
INSECTA				
<i>Acromyrmex octospinosus</i> (Reich)	Hymenoptera: Formicidae	CABI, 2010	CO (Figueroa, 1977)	L (Wetterer et al., 1998)
<i>Acutaspis scutiformis</i> Cockerell	Hemiptera: Diaspididae	Ben-Dov et al., 2010; Bernal and Diaz, 2006; Figueroa, 1977; Posada, 1989; Figueroa, 1977; Saldarriaga 1977; Watson, 2005	CO (Ben-Dov et al., 2010; Bernal and Diaz, 2005; Figueroa, 1977; Kondo, 2001; Mosquera, 1989; Posada, 1989; Rios et al., 2005; Watson, 2005); US (TX) (Ben-Dov et al., 2007; Miller, 2005; Watson, 2005)	L (Figueroa, 1977; Posada, 1989)
<i>Aethalion reticulatum</i> (Linneaus.)	Hemiptera: Aetalionidae	Ebeling, 1959; Posada, 1989	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989)	L (ICA, 1982; Posada, 1989); S (Figueroa, 1977)
<i>Aleurocanthus woglumi</i> Ashby	Hemiptera: Aleroididae	Ebeling, 1959; PestID, 2011	CO (CABI, 2010; Posada, 1989); US (AZ, CA, FL, MS, TX) (CABI, 2010; Ebeling, 1959; Evans, 2008; Nguyen, 1998)	L, S (CABI, 2010; Posada, 1989)

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
<i>Aleurodicus cocois</i> (Curtis)	Hemiptera: Aleroididae	CABI, 2010; Evans, 2007; Miller et al., 2000	CO (CABI, 2010; Gallego and Vélez, 1992; Posada 1989); US (FL) (Miller et al., 2000)	L (CABI, 2010; Posada 1989)
<i>Aleurodicus coccolobae</i> Quaintance and Baker	Hemiptera: Aleroididae	Miller et al., 2000	CO (Evans, 2007); US (FL) (Hodges and Evans, 2005)	L (Miller et al., 2000)
<i>Aleurodicus dispersus</i> (Russell)	Hemiptera: Aleroididae	PestID, 2011; Evans, 2007; CABI, 2010	CO (CABI, 2010; Posada, 1989); US (Cherry, 1980; EPPO, 2006)	L (Kiyindou, 2002)
<i>Aleurodicus pulvinatus</i> (Maskell)	Hemiptera: Aleroididae	CABI, 2010; Evans, 2007; Miller et al., 2000; Posada, 1989; Saldarriaga et al., 1977	CO (CABI, 2010; Posada, 1989; Saldarriaga et al., 1977)	L (CABI, 2010; Posada, 1989)
<i>Aleuroplatus cococolus</i> Quaintance and Baker	Hemiptera: Aleroididae	PestID, 2011; Evans, 2007	CO (Evans, 2007; Posada, 1989)	L (PestID, 2011; Posada, 1989)
<i>Antiteuchus pallescens</i> Stal	Hemiptera: Miridae	Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	CO (Bernal and Diaz, 2006; Figueroa, 1977; Posada, 1989)	Br, F, L, and Pe (Bernal and Diaz, 2006)
<i>Antiteuchus piceus</i> Palisot-Beauvois	Hemiptera: Miridae	Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	CO (Bernal and Diaz, 2006; Figueroa, 1977; Posada, 1989)	Br, F, L, and Pe (Bernal and Diaz, 2006)
<i>Antiteuchus tripterus</i> (Fabricius)	Hemiptera: Miridae	Madrigal, 2002; PestID, 2011; Posada, 1989	CO (Bernal and Diaz, 2006; Castaño, 1983; Figueroa, 1977; Posada, 1989)	Br, F, L, Pe (Bernal and Diaz, 2006)
<i>Antiteuchus variegatus</i> Dallas	Hemiptera: Miridae	Figueroa, 1977	CO (Figueroa, 1977)	L (Figueroa, 1977)
<i>Atta cephalotes</i> (Linne.)	Hymenoptera: Formicidae	CABI, 2010; Castaño, 1983	CO (CABI, 2010; Figueroa, 1977)	L (CABI, 2010)
<i>Atta sexdens</i> Linnaeus	Hymenoptera: Formicidae	Ebeling, 1959; Peña et al., 2002	CO (CABI, 2010; Posada, 1989)	L (CABI, 2010; Peña et al., 2002; Posada, 1989)
<i>Aulacaspis tubercularis</i> (Newstead)	Hemiptera: Diaspididae	Ben-Dov et al., 2007; CABI, 2010	CO (CABI, 2010; Figueroa, 1977; Gallego and Vélez, 1992; Mosquera, 1989; Posada, 1989; PestID, 2011; Watson, 2005); US (FL) (Miller et al., 2005)	F (PestID, 2011; CABI, 2010); L, S (CABI, 2010; Posada, 1989; Watson, 2005)

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
<i>Automeris ilustris</i> Walker	Lepidoptera: Geometridae	Figueroa, 1977	CO (Figueroa, 1977)	L (Figueroa, 1977)
<i>Bombacoccus aguacatae</i> Kondo	Hemiptera: Coccidae	Kondo, 2010	CO (Kondo, 2010)	S (Kondo, 2010)
<i>Bostrychopsis uncinata</i> Germar	Coleoptera: Bostrichidae	Figueroa, 1977	CO (Posada, 1989)	Br (Figueroa, 1977)
<i>Brugmaniella perseae</i> Gagné	Diptera: Cecidomyiidae	Gagne et al., 1994	CO (Gagne et al., 1994)	F (Gagne et al., 1994)
<i>Ceroplastes rubens</i> Maskell	Hemiptera: Coccidae	Ben-Dov et al., 2010; CABI, 2010; Ebeling, 1959; PestID, 2011	CO (Kondo, 2008); US (FL) (Ben-Dov et al., 2010; CABI, 2010)	L (CABI, 2010); S (CABI, 2010; Peña et al., 2002)
<i>Chlorocoris tau</i> Spinola	Hemiptera: Miridae	Figueroa, 1977	CO (Figueroa, 1977)	Sh (Figueroa, 1977)
<i>Coccus nigra</i> Guenée	Hemiptera: Coccidae	Bernal and Diaz, 2006; Posada, 1989; Saldarriaga, 1977	CO (Bernal and Diaz, 2006; Posada, 1989; Saldarriaga, 1977)	Br, F, L (Bernal and Diaz, 2006)
<i>Copaxa andensis</i> Lemaire	Lepidoptera: Saturnidae	Robinson et al., 2011	CO (Amarillo, 2000)	L (Amarillo, 2008)
<i>Copaxa decrescens</i> Walker	Lepidoptera: Saturnidae	Robinson et al., 2011	CO (Amarillo, 2000)	L (Dorantes et al., 2006)
<i>Copaxa denhezi</i> Lemaire	Lepidoptera: Saturnidae	Robinson et al., 2011	CO (Amarillo, 2000; Robinson et al., 2011)	L (Amarillo, 2008)
<i>Copaxa multifenestrata</i> (Heinrich-Shaffer)	Lepidoptera: Saturnidae	Robinson et al., 2011; Zhang, 1994	CO (Amarillo, 2000)	L (Dorantes et al 2006; Teliz, 2000)
<i>Copaxa rufinans</i> Schaus	Lepidoptera: Saturnidae	Janzen and Hallwachs, 2005; Robinson et al., 2011	CO (Amarillo, 2000)	L (Amarillo, 2008)
<i>Copaxa simson</i> Mass. & Weym.	Lepidoptera: Saturnidae	Robinson et al., 2011	CO (Amarillo, 2000; Figueroa, 1977)	L (Amarillo, 2008)
<i>Coptotermes niger</i> Snyder.	Isoptera: Rhinotermitidae	Eveling, 1959	CO (Constantino, 2001)	R (López, 2002)
<i>Copturomimus perseae</i> Hustache	Coleoptera: Curculionidae	Ebeling, 1959; Peña et al., 2002; Posada, 1989; Waite and Martínez, 2002	CO (Bernal and Diaz, 2006; Ebeling, 1959; Peña et al., 2002; Posada, 1989)	Br, S (Bernal and Diaz, 2006; Peña et al., 2002; Posada, 1989)
<i>Crematogaster brevispinosa</i> Mayr	Hymenoptera: Formicidae	Ebeling, 1959	CO (Figueroa, 1977; Posada, 1989)	Br (Figueroa, 1977); S(Figueroa, 1977; Posada, 1989)

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
<i>Cryptaspasma</i> sp. near to <i>lugubris</i> (Felder)	Lepidoptera: Tortricidae	Brown and Brown, 2004; Gallego and Vélez, 1992	CO (ICA, 1985; Gallego and Vélez, 1992)	F, Se (Gallego and Vélez, 1992)
<i>Empoasca stevensi</i> Young	Hemiptera: Cicadellidae	Mau and Martin, 2007	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989)	L (Figueroa, 1977; Posada, 1989); S (Mau and Martin, 2007)
<i>Enchenopa</i> <i>lanceolata</i> (Stoll)	Hemiptera: Membracidae	Figueroa, 1977	CO (Figueroa, 1977)	L (Figueroa, 1977)
<i>Euglyphis fibra</i> Schaus	Lepidoptera: Lasiocampidae	Ebeling, 1959; Posada, 1989; Robinson et al., 2011; Zhang, 1994	CO (Posada, 1989)	L (Posada, 1989)
<i>Frankliniella bruneri</i> Watson	Thysanoptera: Thripidae	Johansen et al., 1999; Teliz, 2000	CO (NAPPO, 2000; PestID, 2011)	F, Fl (Johansen et al., 1999; Peña et al., 2002)
<i>Frankliniella</i> <i>gardeniae</i> Moulton	Thysanoptera: Thripidae	Cárdenas and Posada, 2001; Echeverri et al., 2004	CO (Cárdenas and Posada, 2001; Echeverri et al., 2004)	F, Fl (Echeverri et al., 2004 Cárdenas and Posada, 2001)
<i>Glena bisulca</i> Rindge	Lepidoptera: Geometridae	ICA, 1980	CO (Gallego and Vélez, 1992; Posada, 1989)	L (Madrigal, 1986; Posada, 1989)
<i>Gymnetosoma</i> <i>pantherina</i> Burmeister ³³	Coleoptera: Scarabaeidae	Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989; Saldarriaga, 1977	CO (Figueroa, 1977; osada, 1989; Saldarriaga, 1977)	F (Posada, 1989)
<i>Heilipus elegans</i> Guérin-Ménéville	Coleoptera: Curculionidae	Castañeda- Vildózola et al., 2007; Rubio et al., 2009	CO (Rubio et al., 2009)	F (González- Herrera, 2003), S (Castañeda- Vildózola et al., 2007; Rubio et al., 2009)
<i>Heilipus lauri</i> Boheman	Coleoptera: Curculionidae	CABI, 2010; Ebeling, 1959; Posada, 1989; Rios et al., 2005; Saldarriaga, 1977; Waite and Martinez, 2002	CO (CABI, 2010; Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989); US (CA) (Ebeling, 1959)	F, Se (Peña et al., 2002; Posada, 1989; Waite and Martinez, 2002)
<i>Heilipus</i> sp. near <i>pittieri</i> Barber	Coleoptera: Curculionidae	Posada, 1989	CO (Posada, 1989; Urueta, 1976); Rubio et al., 2009)	F (Posada, 1989)

³³ Authority Blanchard is listed with the cited sources of Figueroa (1977), Gallego and Velez (1992), and Posada (1989). However authority Burmeister is listed in other literature sources that are not cited in this document.

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
<i>Heilipus trifasciatus</i> (Fabricius)	Coleoptera: Curculionidae	Gallego and Vélez, 1992	CO (Cardenas and Posada, 2001; Gallego and Vélez, 1992)	F (Cardenas and Posada, 2001; Hoyos and Giraldo, 1984)
<i>Heterotermes tenuis</i> (Hagen)	Isoptera: Rhinotermitidae	Ebeling, 1959	CO (Belloti et al., 2002; Constantino, 2001)	R, S (Belloti et al., 2002)
<i>Hylesia continua</i> (Walker)	Lepidoptera: Saturniidae	Janzen and Hallwachs, 2005; Robinson et al., 2011	CO (Amarillo, 2000)	L (Janzen and Hallwachs, 2005)
<i>Icerya</i> <i>montserratensis</i> Riley and Howard	Hemiptera: Margarodidae	Ben-Dov et al., 2007; Ebeling, 1959	CO (Ben-Dov et al., 2007; Figueroa, 1977; Posada, 1989)	L (Posada, 1989)
<i>Jocara conspiciualis</i> Lederer	Lepidoptera: Pylalidae	Figueroa, 1977; Posada, 1989; Cardenas and Posada, 2001;Saldarriaga, 1977	CO (Figueroa, 1977; Posada, 1989, Cardenas and Posada, 2001; Saldarriaga, 1977)	L (Posada, 1989; Cardenas and Posada, 2001)
<i>Jocara subcurvularis</i> Shaus	Lepidoptera: Pylalidae	Bernal and Diaz, 2006; Saldarriaga et al., 1977	CO (Bernal and Diaz, 2006; Saldarriaga et al., 1977)	L (Bernal and Diaz, 2006; Saldarriaga et al., 1977)
<i>Laurencella</i> <i>colombiana</i> Foldi and Watson	Hemiptera: Margarodidae	Ben-Dov et al., 2007; Foldi and Watson, 2001; Gil et al.,2007	CO (Ben-Dov et al., 2007; Foldi and Watson, 2001; Gil et al., 2007)	L, S (Ben-Dov et al., 2007; Gil et al., 2007)
<i>Lecanoideus</i> <i>mirabilis</i> (Cockerell)	Hemiptera: Aleroididae	Figueroa, 1977	CO (Evans, 2007; Figueroa, 1977)	L (Figueroa, 1977)
<i>Maconellicoccus</i> <i>hirsutus</i> (Green)	Hemiptera: Pseudococcidae	CABI, 2012; Hall et al., 2008; Sagarra and Peterkin, 1999	CO ³⁴ (ICA, 2010; Kondo et al., 2008), US (CA, FL, GA, LA, TX) (CABI, 2012)	F, L, S (ICA, 2010)
<i>Macraspis lucida</i> Olivier	Coleoptera: Scarabaeidae	Figueroa, 1977	CO (Figueroa, 1977; Posada, 1989; Serna, 2004)	Fl (Figueroa, 1977; Posada, 1989); R (Serna, 2004)

³⁴ *Maconellicoccus hirsutus* is present in Colombia with restricted distribution, under official control due to few occurrences within the following Departments: Arauca, Atlántico, Cordoba, La Guajira, Magdalena, Norte de Santander, San Andres, and Sucre (ICA, 2008, 2010; 2012; Kondo et al., 2008). High temperatures in those areas are not favorable climatic for the production of 'Hass' avocado. The avocado plants surveyed in the aforementioned Colombian region may correspond to other hosts and cultivars different from 'Hass' avocado. This is supported by data showing current 'Hass' avocado production areas in Colombia (Consejo Nacional del Aguacate, 2011a) where *M. hirsutus* has not been found (ICA,2010). However, we further analyze this pest in this document. conditions for the production of 'Hass' avocado. The avocado plants surveyed in those Colombian regions may correspond to other hosts and cultivars different from 'Hass' avocado. This is supported by data showing current 'Hass' avocado production areas in Colombia (Consejo Nacional del Aguacate, 2011a) where *M. hirsutus* has not been found (ICA,2010).

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
<i>Macroductylus tenuilineatus</i> Guérin-Ménéville	Coleoptera: Scarabaeidae	Figueroa, 1977; Madrigal, 2002	CO (Evans and Smith, 2007; Figueroa, 1977; Posada, 1989)	Fl (Figueroa, 1977; Madrigal, 2002); L (Posada, 1989)
<i>Megalopyge lanata</i> Stoll	Lepidoptera: Megalopygidae	Figueroa, 1977; Posada, 1989; Robinson et al., 2011; Saldarriaga, 1977	CO (Figueroa, 1977 Posada, 1989; 1977; Saldarriaga, 1977; Zhang, 1994)	L (Figueroa, 1977; Madrigal, 1986; Posada, 1989)
<i>Megalopyge orsilochus</i> Cramer	Lepidoptera: Megalopygidae	Cardenas and Posada, 2001; Posada, 1989	CO (Cardenas and Posada, 2001; Posada, 1989)	L (Cardenas and Posada, 2001; Posada, 1989)
<i>Membracis mexicana</i> Guer.	Hemiptera: Membracidae	Ebeling, 1959; Maes et al. 2011	CO (Madrigal, 1986; Madrigal, 2003)	S (Madrigal, 1986; F (Cordova, 2011)
<i>Metcalfiella monogramma</i> Germar	Hemiptera: Membracidae	PestID, 2011; Ebeling, 1959	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989)	Br (Peña et al., 2002); L (PestID, 2011; Posada, 1989)
<i>Micrapate</i> sp. cerca <i>exigua</i> (Lesne)	Coleoptera: Bostrichidae	Posada, 1989, PestID, 2011	CO (Posada, 1989)	Br (Posada, 1989)
<i>Monalonion velezangeli</i> Carvalho and Costa	Hemiptera: Miridae	Bernal and Diaz, 2006; Cárdenas and Posada, 2001; Gallego and Vélez, 1992	CO (Bernal and Diaz, 2006; Cárdenas and Posada, 2001)	F (Bernal and Diaz, 2006; Cárdenas and Posada, 2001); L (Lynce, 2007)
<i>Mycetaspis personata</i> (Comstock) Syn.: <i>Chrysomphalus personatus</i> Fernald	Hemiptera: Diaspididae	Ebeling, 1959; Watson, 2005	CO (Ben-Dov et al., 2007; Kondo, 2001; Posada, 1989; Watson, 2005); US (FL) (Watson, 2005; Ben- Dov, 2010)	F, Fl, L (Watson, 2005)
<i>Nipaecoccus jonmartini</i> Williams & Granara de Willink	Hemiptera: Pseudococcidae	Ben-Dov et al., 2010; Williams and Granara, 1992	CO (Ben-Dov et al., 2; Kondo, 2001; Williams and Granara, 1992)	L (Posada, 1989)
<i>Oiketicus geyeri</i> Berg	Lepidoptera: Psychidae	Bernal and Diaz, 2006; Carvajal, 2005; Castaño, 1983; Posada, 1989; Saldarriaga, 1977	CO (Bernal and Diaz, 2006; Carvajal, 2005; Posada, 1989; Saldarriaga, 1977)	L(Bernal and Diaz, 2006; Posada, 1989)
<i>Oiketicus kirbyi</i> Goulding	Lepidoptera: Psychidae	Castaño, 1983; Figueroa, 1977; Peña et al., 2002; Robinson et al., 2011; Saldarriaga, 1977	CO (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977; Zhang, 1994)	L (Peña et al., 2002; Posada, 1989)

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
<i>Oncideres digna</i> Bates	Coleoptera: Cerambycidae	Figueroa, 1977; Posada, 1989	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989; Quintero, 2006)	Br, S (Figueroa, 1977; Posada, 1989)
<i>Oncometopia obtusa</i> (Fabricius)	Hemiptera: Cicadellidae	Saldarriaga et al., 1977	CO (Freitag and Sharkey, 2002; Posada, 1989; Saldarriaga et al., 1977)	L (Posada, 1989)
<i>Paraputo olivaceus</i> (Cockerell)	Hemiptera: Pseudococcidae	Ebeling, 1959	CO (Ben-Dov et al., 2010); US (CA, FL, TX) (Ben-Dov et al., 2010; Miller 2005)	R (Posada, 1989)
<i>Periphoba arcae</i> Druce	Lepidoptera: Saturnidae	Janzen and Hallwachs, 2005	CO (Amarillo, 2000)	L (Arco-verde, 2002)
<i>Phobetrion</i> <i>hipparchia</i> Cramer	Lepidoptera: Limacodidae	Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	CO (Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989; Saldarriaga, 1977; Zhang, 1994)	L (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)
<i>Phyllocnistis</i> <i>perseafolia</i> (Davis and Wagner, sp. n.)	Lepidoptera: Gracillariidae	Davis and Wagner, 2011	CO (Davis and Wagner, 2011)	L, F (Davis and Wagner, 2011)
<i>Pleseobyrsa</i> <i>boliviana</i> Drake and Poor	Hemiptera: Tingidae	Posada, 1989	CO (Posada, 1989; Saldarriaga, 1977)	L (Posada, 1989)
<i>Pleseobyrsa</i> <i>chiriquensis</i> (Champion)	Hemiptera: Tingidae	Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989	CO (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)	L (Gallego and Vélez, 1992; Posada, 1989)
<i>Protopulvinaria</i> <i>longivalvata</i> Green	Hemiptera: Coccidae	Ebeling, 1959; Saldarriaga 1977	CO (Gallego and Vélez, 1992; Kondo, 2001; Posada, 1989; Saldarriaga 1977)	L, S (Rung et al., 2007)
<i>Pseudischnaspis</i> <i>acephala</i> Ferris	Hemiptera: Diaspididae	Kondo, 2001; Gallego and Vélez, 1992; Mosquera, 1989; Posada, 1989	CO (Ben-Dov et al., 2007; Kondo, 2001; Posada, 1989; Watson, 2005)	F (Watson, 2005; Miller et al., 1984); L (Ben-Dov et al., 2007; Posada, 1989)
<i>Puto barberi</i> Cockerell	Hemiptera: Pseudococcidae	Ben-Dov et al., 2007	CO (Ben-Dov et al., 2007; Posada, 1989; Williams and Granara, 1992)	R (Posada, 1989)
<i>Rothschildia orizaba</i> Westwood	Lepidoptera: Saturnidae	Robinson et al., 2011	CO (Amarillo, 2000; Figueroa, 1977; Posada, 1989)	L (Figueroa, 1977; Posada, 1989)
<i>Sibine nesea</i> Stoll	Lepidoptera: Limacodidae	Figueroa, 1977; Posada, 1989; Robinson et al., 2011; Saldarriaga, 1977	CO (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)	L (Figueroa, 1977; Posada, 1989; Saldarriaga, 1977)

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
<i>Stenoma catenifer</i> Walsingham	Lepidoptera: Elaschistidae	Bernal and Diaz, 2006; CABI, 2010; Ebeling, 1959; Posada, 1987; Robinson et al., 2011; Waite and Martinez, 2002; Zhang, 1994	CO (Bernal and Diaz, 2006; CABI, 2010; Carvajal, 2005; Cardenas and Posada, 2001; Zhang, 1994)	F, Se (CABI, 2010; Carvajal, 2005; L (Atehortua de la cuesta, 1975); S (CABI, 2010)
<i>Thrips palmi</i> Karny	Thysanoptera: Thripidae	CABI, 2010; Duran et al., 1999	CO (Duran et al., 1999; CABI, 2010); US (CABI, 2010)	F, L (CABI, 2010; Duran et al., 1999)
<i>Trachyderes succinctus succinctus</i> Linnaeus	Coleoptera: Cerambycidae	Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	CO (Figueroa, 1977; Peña and Bennett, 1995; Martinez, 2000; Posada, 1989)	Br, S (Figueroa, 1977; Posada, 1989; Morales, 1994)
<i>Trioza perseae</i> Tuthill	Hemiptera: Psyllidae	Bernal and Diaz, 2006; Figueroa, 1977; Gallego and Vélez, 1992; Peña et al., 2002; Posada, 1989	CO (Bernal and Diaz, 2006; Figueroa, 1977; Gallego and Vélez, 1992; Saldarriaga, 1977)	L (Bernal and Diaz, 2006; Gallego and Vélez, 1992; Peña et al., 2002)
<i>Turuptiana obliqua</i> Walker	Lepidoptera: Arctiidae	Ebeling, 1959; Figueroa, 1977; Gallego and Vélez, 1992	CO (Ebeling, 1959; Figueroa, 1977; Gallego and Vélez, 1992; Posada, 1989)	L (Figueroa, 1977; Posada, 1989; Cardenas and Posada, 2001)
<i>Vinsonia stellifera</i> (Westwood)	Hemiptera: Coccidae	Ben-Dov et al., 2007	CO (Ben-Dov et al., 2007; Kondo, 2001; Posada, 1989); US (AL, FL) (Ben- Dov et al., 2007; Hamon and Williams, 1984)	L (Figueroa, 1977; Hill, 1983); S (Peña et al., 2002)
<i>Xyleborus capucinus</i> Eichhoff	Coleoptera: Scolytidae	Posada, 1989	CO (Figueroa, 1977; Posada, 1989)	Br, S (Posada, 1989)
<i>Xyleborus morigerus</i> Blandford	Coleoptera: Scolytidae	CABI, 2010;; Figueroa, 1977; Posada, 1989; Saldarriaga, 1977	CO (Gallego and Vélez, 1992; Posada, 1989)	Br, S (Posada, 1989)
<i>Xyleborus</i> sp. cerc. <i>Ia ferox</i> Bland.	Coleoptera: Scolytidae	Gallego and Vélez, 1992	CO (Gallego and Vélez, 1992)	S (Gallego and Vélez, 1992)
<i>Xylopsocus capucinus</i> Fabricius	Coleoptera: Bostrichidae	Blinda and Joly, 1991; Woodruff et al., 2000	CO (Gallego and Velez, 1992); US (FL) (Haac, 2006)	Br, S (Woodruff et al., 2000)

Pest	Taxonomy	Reported on <i>Persea americana</i>	US and Colombia Distribution	Plant part association
FUNGI and CHROMISTANS³⁵				
<i>Asteridiella perseae</i> (F. Stevens) Hansf. Syn: <i>Irene perseae</i> (F. Stevens) Toro	Ascomycetes: Meliolales	Bernal and Diaz, 2006; Buriticá, 1999; Farr et al., 1989	CO (Bernal and Diaz, 2006; Buriticá, 1999; Farr and Rossman, 2011); US (FL) (Farr and Rossman, 2011)	L, F (Bernal and Diaz, 2006)
<i>Calonectria</i> <i>pauciramosa</i> C.L. Schoch and Crous Anamorph: <i>Cylindrocladium</i> <i>pauciramsum</i> C.L. Schoch and Crous	Ascomycetes: Hypocreales	Farr and Rossman, 2011	CO (Farr and Rossman, 2011)	L, R (Crous, 2002)
<i>Calothyriolum</i> <i>apiahynum</i> Spig	Ascomycetes: Capnodiales	Tamayo, 2007	CO (Buriticá, 1999; Tamayo, 2007)	F, L, S (Tamayo, 2007)
<i>Lembosia perseae</i> Orejuela	Ascomycetes: Capnodiales	Buritica, 1999; Bernal and Diaz, 2006; Tamayo, 2007	CO (Buritica, 1999; Bernal and Diaz, 2006; Farr and Rossman, 2011)	L, F (Bernal and Diaz, 2006)
<i>Microthia havanensis</i> (Bruner) Gryzenh. & M.J. Wingf.	Ascomycetes: Diaporthales	Farr and Rossman, 2011; Wellman, 1977	CO (Buriticá, 1999) US (FL) (Farr and Rossman, 2011)	Br (Wellman, 1977)
<i>Pestalotiopsis</i> <i>disseminata</i> (Thuem.) Steyaert	Ascomycetes: Xylariales	Farr and Rossman, 2011	CO (Buritica, 1999); US (FL) (Farr and Rossman, 2011)	L (Farr and Rossman, 2011)
<i>Phyllachora</i> <i>gratissima</i> Rehm	Ascomycetes: Phyllachorales	Bernal and Diaz, 2006; Buritica, 1999; Farr and Rossman, 2011; Morales et al., 2005	CO (Buritica, 1999; Bernal and Diaz, 2006; Farr and Rossman, 2011)	F (PestID, 2011); L (PestID, 2011, Bernal and Diaz, 2006)
<i>Rosellinia bunodes</i> (Berk. & Broome) Sacc.	Ascomycetes: Xylariales	Farr and Rossman, 2011; Ploetz, 2003; Wellman, 1977	CO (Buriticá, 1999); Farr and Rossman, 2011; Morales et al., 2005)	R (Holliday, 1980; Wellman, 1977)
<i>Rosellinia pepo</i> Pat.	Ascomycetes: Xylariales	CABI, 2010; Wellman, 1977	CO (Buriticá, 1999; CABI, 2010)	L, R, S (CABI, 2010)
NEMATODES³⁶				
<i>Helicotylenchus</i> <i>erythrinae</i> Zimmermann	Hoplolaimidae	Ferris, 2010	CO (Buriticá, 1999)	R (Zuñiga, 1979)

³⁵ Fungal classification and nomenclature are written according SMML (Farr and Rossman, 2011).

³⁶ Taxonomy of nematodes per Siddiqi (2000).

Appendix G. Information on Avocado Botany, Origin, and Production

Botany and Origin

Persea americana Mill. var 'Hass' is a cultivar from the Guatemalan race (*P. americana* var. *guatemalensis*). This plant is an evergreen tree 5.4 to 6.4 m (18 to 21 feet) high. It has a primary anchorage root system that penetrates 3 to 4 m, (118.1 to 157.4 in), simple and entire leaves that are spirally arranged, panicle inflorescences of cymes at the end of the twigs, and 3-merous bisexual flowers. The fruit is oval-shaped, with small to medium seed, weighing 6 to 14 ounces, with pebbly skin that gets dark when the fruit is ripe; its flesh turns to a creamy pale green (Álvarez de la Peña 1981; CABI 2010; Koch, 1983; Ploetz et al., 2003; University of California, 2011).

The 'Hass' cultivar grows in altitudes from 1300 to 2600 meters above sea level, with temperatures from 15 to 22°C (59 to 71.6°F). Precipitation of 800 to 1600 mm and 1500 light hours per year are recommended (Álvarez de la Peña 1981). Although it is a Guatemalan race variety, this avocado is susceptible to frost [below 30°F (-1.1°C)], so it should be planted only in frost-free areas (Álvarez de la Peña 1981).

As a fruit, avocado has exceptionally high mineral (iron, magnesium, and potassium), vitamin (A, C, E, and four essential B vitamins), and complete protein contents. It has no sodium and has monounsaturated oil content 3-30 percent depending on the variety. Consumption is most often as an uncooked savory dish mixed with herbs or spices, as an ingredient of salads, or as a sweetened dessert. In the cosmetic industry the oil is used in soaps and skin-moisturizing products. The flesh is also used in traditional medicine (CABI, 2010; Morales, 1994; Peña et al., 2002).

Worldwide Production

The world avocado industry is large and growing rapidly. In 2009, Mexico, the largest producer, yielded 1,124,565 metric tons (MT). Other major producers in 2009 were the United States (114,305 MT), Indonesia (225,180 MT), Brazil (166,000 MT), Chile (250,000 MT), the Dominican Republic (187,398 MT), and Peru (121,720). Colombia produced 183,987 MT of avocado in 2006 [FAO (2009), as cited by CABI, 2010]. Israel, Spain, South Africa, and the United States participate in the international avocado trade. The main importing countries are the United Kingdom and France, but new markets are opening in other European countries and more recently in Japan (CABI 2010; Ploetz et al., 2003).

In 2008 and 2009, the United States produced 125,950 tons of avocados (ERS, 2008). California produced about 90 percent of the total U.S. avocado crop (98,000 tons), while Florida and Hawaii accounted for nearly 9% (27,450 tons) and 1% (500 tons), respectively (ERS, 2008; FAS, 2008a). Main avocado imports into the United States come from Mexico (supplying year-round), Chile (providing from June through April), and recently from Peru (Meade et al., 2010; Plattner, 2010). Consumption in the United States reached 3.83 pounds per person in 2008/2009 and was estimated to approach 4.0 pounds in 2009/2010 (Plattner, 2010). The total avocado supply in 2008 and 2009 in the United States was 1,181.7 million pounds, which comprised domestic production (250.7 million pounds) and imports (931 million pounds) (ERS, 2009).