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Importation of Sand Pear (*Pyrus pyrifolia* (Burm. f.) Nakai) for Consumption from the Republic of Korea into the United States

A Pest List Initiated by a PPQ-Internal Request to Update the Existing Republic of Korea Sand Pear Work Plan

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Executive Summary

The Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA) prepared this document to identify plant pests associated with importing commercially-produced fruit of sand pear, *Pyrus pyrifolia* (Burm. f.) Nakai (Rosaceae), for consumption from the Republic of Korea into the United States. Based on an internal request submitted by Plant Protection and Quarantine (PPQ) we considered the pathway to include the processes and conditions set forth in the current the Republic of Korea Sand Pear Work Plan.

Using scientific literature, port-of-entry pest interception data, and information from the government of the Republic of Korea, we developed a list of quarantine pests for the United States that occur in the Republic of Korea (on any host), are associated with the commodity plant species (anywhere in the world), and could follow the pathway. We determined that the following 11 pests have the potential to be associated with sand pear fruit from the Republic of Korea.

Pest type	Taxonomy	Scientific name
Arthropod	Acari: Tetranychidae	<i>Tetranychus viennensis</i> Zacher
	Diptera: Cecidomyiidae	<i>Resseliella yagoi</i> Yukawa and Sato ¹
	Hemiptera: Phylloxeridae	<i>Aphanostigma iaksuiense</i> (Kishida) ²
	Hemiptera: Pseudococcidae	<i>Crisicoccus matsumotoi</i> (Siraiwa)
		<i>Planococcus kraunhiae</i> (Kuwana)
	Lepidoptera: Carposinidae	<i>Carposina sasakii</i> Matsumura
	Lepidoptera: Pyralidae	<i>Acrobasis pyrivorella</i> (Matsumura)
<i>Conogethes punctiferalis</i> (Guenée)		
Pathogen	Fungi	<i>Alternaria gaisen</i> Nagan
		<i>Monilinia fructigena</i> (Aderhold & Ruhland) Honey
		<i>Venturia nashicola</i> Tanaka & Yamamoto

¹ This is the only pest that was not included in the 2014 Sand Pear Work Plan.

² *Aphanostigma piri* was listed in the 2014 Sand Pear Work Plan with *A. iaksuiense* listed as a synonym. This was an error. The names refer to two different species with only *A. iaksuiense* occurring in the Republic of Korea.

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1. Introduction

1.1. Background

Fresh fruit of sand pear, *Pyrus pyrifolia* (Burm. f.) Nakai, has been authorized entry into the United States since 1997. On July 7, 2017, the South Korean government requested changing the existing preclearance program to an audit-based program for exporting the fruit. Based upon this request, 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) prepared this pest list to update the existing Work Plan.

1.2. Initiating event

The importation of fruits and vegetables for consumption into the United States is regulated under Title 7, Part 319.56, of the Code of Federal Regulations (7 CFR §319.56).

1.3. Description of the pathway

A pathway is “any means that allows the entry or spread of a pest” (IPPC, 2017). In the context of this document, the pathway is the commodity to be imported, together with all the processes the commodity undergoes, from production through importation and distribution, that may have an impact on pest presence. The following description of this pathway focuses on those relevant conditions and processes. The conclusions in this document are therefore contingent on the application of all components of the pathway as described below.

1.4.1. Description of the commodity

The specific pathway of concern is the importation of fresh fruit of sand pear for consumption.

1.4.2. Summary of the production, harvest and post-harvest procedures, and shipping and storage conditions being considered

Import conditions are specified in the pre-existing Work Plan.

2. Pest List and Pest Categorization

The pest list is a compilation of plant pests with regulatory status for the PRA area. This includes pests that are both present in the export area (on any host) and are known to be associated with *P. pyrifolia* (anywhere in the world). Species on the pest list with a reasonable likelihood of being present on the commodity at the time of harvest could follow the pathway into the PRA area. Pests are considered to be of quarantine significance if they are actionable at U.S. ports of entry and include known quarantine pests, regulated non-quarantine pests, pests under official control or considered for official control and pests that require evaluation for regulatory action.

2.1. Pest list

In Table 1, we list the quarantine pests that occur in the export area on any host and are associated with the commodity, whether in the export area or elsewhere in the world. For each pest, we indicate 1) the part of the plant the pest is generally associated with and 2) whether the pest is likely to remain with the commodity in a viable form following harvesting from the field and prior to any post-harvest processing. We developed this pest list based on the scientific literature, port-of-entry pest interception data, and information provided by the government of the Republic of Korea. We note which pests are already listed in the the Republic of Korea Sand

Pear Work Plan (APHIS, 2014). Pests in shaded rows are likely to remain associated with the harvested commodity (Table 2); for these pests we also denote U.S. distribution as appropriate.

Table 1. Quarantine pests associated with *Pyrus pyrifolia* (Burm. f.) Nakai (in any country) and present in the Republic of Korea (on any host).

Pest name	Presence in the Republic of Korea	Host association	Plant part(s)	Notes
ACARI				
Tarsonemidae				
<i>Tarsonemus</i> sp.	Listed in 2014 Work Plan	Listed in 2014 Work Plan		Listed in the 2014 Work Plan
Tetranychidae				
<i>Tetranychus truncatus</i> Ehara	Migeon and Dorkeld, 2019a	Migeon and Dorkeld, 2019a	Leaf (CABI, 2019a)	
<i>Tetranychus viennensis</i> Zacher	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Leaf, Flower, Fruit (Pucat and Garland, 1996)	Listed in the 2014 Work Plan
INSECTA				
COLEOPTERA				
Cerambycidae				
<i>Anoplophora chinensis</i> (Förster)	CABI, 2019b	CABI, 2019b	Trunk, Root (Aono and Murakoshi, 1980)	
<i>Apriona germari</i> (Hope)	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Bacchisa fortunei</i> (Thomson)	KSP, 1972	She et al., 2005	Leaf, Stem (Xu et al., 2007)	
<i>Batocera lineolata</i> Chevrolat	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Exocentrus lineatus</i> (Bates)	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Mesosa myops</i> (Dalman)	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Moechotypa diphysis</i> (Pascoe)	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Nupserha marginella</i> (Bates)	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Oberea inclusa</i> Pascoe	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Oberea japonica</i> Thunberg	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Purpuricenus lituratus</i> Ganglbauer	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	

Pest name	Presence in the Republic of Korea	Host association	Plant part(s)	Notes
<i>Purpuricenus temminckii</i> (Guérin-Méneville)	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
<i>Trichoferus campestris</i> (Faldermann)	Lim et al., 2014	Lim et al., 2014	Stem, Twig (Lim et al., 2014)	
Chrysomelidae				
<i>Agelasa nigriceps</i> Motschulsky	Lee, 2012	Lee, 2012	Leaf (Kohyama et al., 2012)	
<i>Agelastica coerulea</i> Baly	Lee, 2012	Lee, 2012	Leaf (Park et al., 2004)	
<i>Fleutiauxia armata</i> (Baly)	Lee, 2012	Lee, 2012	Leaf (Kubota, 2010)	
<i>Lypesthes ater</i> (Motschulsky)	Lee, 2012	Lee, 2012	Leaf (Chujo, 1954)	
<i>Paropsides duodecimpustulatus</i> (Gebler)	Lee, 2012	Lee, 2012	Leaf (Park and Lee, 2003)	
Curculionidae				
<i>Anthonomas pomorum</i> (L)	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Flower; Leaf (CABI, 2019)	Listed in the 2014 Work Plan
<i>Rhynchites heros</i> Roelofs	Listed in 2014 Work Plan	Listed in 2014 Work Plan	young Fruit* (Katsumata, 1934)	Listed in the 2014 Work Plan *The female deposits usually 1 egg, but sometimes 2 or 3, in a hole in a young fruit, closes the hole, and then injures the stalk so that the fruit falls (Katsumata, 1934)
Scarabaeidae				
<i>Holotrichia parallela</i> Motschulsky	Song et al., 2018	Song et al., 2018	Leaf (adult), Root (larva) (Song et al., 2018)	
DIPTERA				
Cecidomyiidae				
<i>Resseliella yagoi</i> Yukawa and Sato	Yukawa et al., 2009	Yukawa et al., 2009	Fruit (Yukawa et al., 2009)	
HEMIPTERA				
Aleyrodidae				

Pest name	Presence in the Republic of Korea	Host association	Plant part(s)	Notes
<i>Aleurocanthus spiniferus</i> (Quaintance)	CABI, 2019c	CABI, 2019c	Leaf (CABI, 2019c)	
Aphididae				
<i>Aulacorthum magnoliae</i> (Essig & Kuwana)	Blackman and Eastop, 2000	Blackman and Eastop, 2000	Leaf (Blackman and Eastop, 2000)	
<i>Melanaphis siphonella</i> (Essig & Kuwana)	Blackman and Eastop, 2000	Blackman and Eastop, 2000	Leaf?	Plant part based on other species of <i>Melanaphis</i> (Blackman and Eastop, 2000)
<i>Nippolachnus piri</i> Matsumura	Blackman and Eastop, 2000	Blackman and Eastop, 2000	Leaf (Ôtake, 1992)	
<i>Prociphilus kuwanai</i> Monzen	Blackman and Eastop, 2000	Blackman and Eastop, 2000	Leaf (Blackman and Eastop, 2000)	
<i>Prociphilus oriens</i> Mordvilko	Blackman and Eastop, 2000	Blackman and Eastop, 2000	Leaf (Blackman and Eastop, 2000)	
<i>Sappaphis piri</i> Matsumura	Blackman and Eastop, 2000	Blackman and Eastop, 2000	Leaf (Blackman and Eastop, 2000)	
<i>Schizaphis piricola</i> (Matsumura)	Blackman and Eastop, 1994	Blackman and Eastop, 1994	Leaf (Blackman and Eastop, 1994)	
<i>Toxoptera odinae</i> Van der Goot	Blackman and Eastop, 2000	Blackman and Eastop, 2000	Shoot (Blackman and Eastop, 2000)	
Cicadellidae				
<i>Penthimia nitida</i> Lethierry	KSP, 1972	Tayutivutikul and Kusigemati, 1992	Leaf (Tayutivutikul and Kusigemati, 1992)	
Cicadidae				
<i>Cryptotympana atrata</i> (F.)	Lee, 2008	She et al., 2005	Branch (Zhang et al., 2014)	
<i>Graptosaltria nigrofusca</i> (Motschulsky)	KSP, 1972	Yamada and Tutumi, 1989	Trunk, dead Twig (Moriyama and Numata, 2008)	
Coccidae				
<i>Ceroplastes pseudoceriferus</i> Green	García Morales et al., 2016	García Morales et al., 2016	Shoot, Leaf, Inflorescence, Twig (Ali, 1978)	

Pest name	Presence in the Republic of Korea	Host association	Plant part(s)	Notes
<i>Ceroplastes japonicus</i> Green	CABI, 2019d	CABI, 2019d	Foliage, Stem, Branch (CABI, 2019d)	
<i>Ceroplastes rubens</i> Maskell	García Morales et al., 2016	García Morales et al., 2016	Fruit, Leaf, Stem (García Morales et al., 2016)	
<i>Parthenolecanium glandi</i> (Kuwana)	García Morales et al., 2016	García Morales et al., 2016	Leaf (Mazzeo et al., 2016)	
<i>Pulvinaria citricola</i> (Kuwana)	García et al., 2016	García et al., 2016	Leaf (Nohara et al., 2000)	
Pentatomidae				
<i>Plautia stali</i> Scott	Song et al., 2011	Song et al., 2011	Fruit* (Sugie et al., 1996)	*External feeder
Phylloxeridae				
<i>Aphanostigma iaksuiense</i> (Kishida) (syn: <i>Cinacium iaksuiense</i> Kishida)	Yoon and Lee, 1974	Yoon and Lee, 1974; Blackman and Eastop, 2000	Fruit, Branch, Bud [based on feeding behavior for <i>A. piri</i> (Patti and Barbagallo, 2016)].	Listed in the 2014 Work Plan as a synonymus with <i>A. piri</i> (Cholodkovsky). However, they are two similar, but separate species. (Blackman and Eastop, 2000; Favert et al. 2016). We found no evidence that <i>A. piri</i> occurs in Korea.
Pseudococcidae				
<i>Crisicoccus matsumotoi</i> (Siraiwa)	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Fruit (Park and Hong, 1992)	Listed in the 2014 Work Plan
<i>Planococcus kraunhiae</i> (Kuwana)	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Fruit (Morishita, 2005)	Listed in the 2014 Work Plan
<i>Pseudococcus</i> sp.	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Fruit?	Listed in the 2014 Work Plan. <i>Pseudococcus longispinus</i> (Charles, 1982), and <i>P. comstocki</i> (Agnello et al., 1992.) attack fruit; both species are present in Korea on <i>P. pyrifolia</i> (Kwon et al., 2002).
Psyllidae				

Pest name	Presence in the Republic of Korea	Host association	Plant part(s)	Notes
<i>Cacopsylla pyrisuga</i> (Förster)	KSPP, 1972	Chen et al., 2005	Twig (Santas, 1987)	
HYMENOPTERA				
Cephalidae				
<i>Janus piri</i> Okamoto & Muramatsu	KSPP, 1972	She et al., 2005	Branch (Liu, 2001)	
LEPIDOPTERA				
Arctiidae				
<i>Spilarctia imparilis</i> Butler (syn.: <i>Thanatarctia imparilis</i> (Butler))	Bae et al., 2013	Tayutivutikul and Kusigemati, 1992	Leaf (Tayutivutikul and Kusigemati, 1992)	
<i>Spilarctia obliqua</i> (Walker)	KSPP, 1972	Sandhu and Sohi, 1986	Leaf (Biswas, 2006)	
Carposinidae				
<i>Carposina sasakii</i> Matsumura	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Fruit (Kim and Lee, 2002)	Listed in the 2014 Work Plan as <i>Carposina niponensis</i> (Walsingham)
Geometridae				
<i>Ascotis selenaria</i> (Denis & Schiffermüller)	Choi et al., 2011	Robinson et al., 2010	Leaf, Fruit (Choi et al., 2011)	
<i>Biston robustus</i> Butler	KSPP, 1972	Robinson et al., 2010	Leaf (Nishida, 1994/1995)	
<i>Cystidia couaggaria</i> Guenée	KSPP, 1972	Robinson et al., 2010	Leaf (Yamakawa et al., 2012)	
<i>Hypomecis roboraria</i> (Denis & Schiffermüller)	KSPP, 1972	Robinson et al., 2010	Leaf (Higginson et al., 2012)	
<i>Phthonosema tendinosaria</i> (Bremer)	Hong et al., 2012	Robinson et al., 2010	Leaf (Robinson et al., 2010)	
Gracillariidae				
<i>Acrocercops astaurota</i> Meyrick	Kumata et al., 1988	Kumata et al., 1988	Stem (Kumata et al., 1988)	
Lymantriidae				
<i>Lymantria dispar</i> (L.)	KSPP, 1972	Umeya and Okada, 2003	Leaf (Wu et al., 2015)	
<i>Lymantria xyliana</i> Swinhoe	Lee et al., 2015	Chao et al., 1996	Leaf (Shen et al., 2003)	
Lyonetiidae				

Pest name	Presence in the Republic of Korea	Host association	Plant part(s)	Notes
<i>Lyonetia clerkella</i> L.	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Leaf (Sugie et al., 1984)	Listed in the 2014 Work Plan <i>Lyonetia clerkella</i>
Pieridae				
<i>Aporia crataegi</i> (L.)	KSP, 1972	Savela, 2019	Leaf (Carter, 1984)	
Pyralidae				
<i>Acrobasis pyrivorella</i> (Matsumura)	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Fruit, Flower (Walker, 2006)	Listed in the 2014 Work Plan as <i>Ectomyelosis pyrivorella</i> (Matsumura)
<i>Conogethes punctiferalis</i> (Guenée)	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Fruit, Leaf (CABI, 2019)	Listed in the 2014 Work Plan <i>Dichocrocis punctiferalis</i> (Guenée)
<i>Myelois</i> sp.	Listed in 2014 Work Plan	Listed in 2014 Work Plan		Listed in the 2014 Work Plan
Sphingidae				
<i>Marumba gaschkewitschii</i> (Bremer & Grey)	Park, et al., 1999	Park et al., 1999	Branch (larva) (Pittaway and Kitching, 2019); Fruit-sucking (adult) (Kim and Lee, 1986)	
Tortricidae				
<i>Adoxophyes orana</i> (Fischer von Roslerstamm)	Cho et al., 2011	Gilligan and Epstein, 2014	Foliage, Fruit* (Carter, 1984)	*External feeder
<i>Adoxophyes privatana</i> (Walker)	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Leaf (Vang et al., 2013)	Listed in the 2014 Work Plan
<i>Archips breviplicanus</i> Walsingham	Sony et al., 2009	Gilligan, 2019	Leaf (Sony et al., 2009), Fruit* (Sugie et al., 1977)	Listed in the 2014 Work Plan as <i>Cacoecia breviplicana</i> (Walsingham)
				*External feeder
<i>Archips crataegana</i> (Hübner)	Anon., 1994	Robinson et al., 2010	Leaf (Carter, 1984)	
<i>Archips ingentana</i> (Christoph)	Robinson et al., 2010	Robinson et al., 2010	Leaf (Kuznetsov, 1988)	Listed in the 2014 Work Plan as <i>Cacoecia ingentans</i> Christoph
<i>Archips nigricaudana</i> (Walsingham)	Gilligan, 2019	Gilligan, 2019	Leaf (Kuznetsov, 1988)	
<i>Archips xylosteana</i> (L.)	Hoebeke et al., 2008	Gilligan, 2019	Leaf (Kuznetsov, 1988)	

Pest name	Presence in the Republic of Korea	Host association	Plant part(s)	Notes
<i>Ptycholoma lecheana circumclusana</i> (Christoph)]	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Flower Blossom (Akiratsugi et al., 2018)	Listed in the 2014 Work Plan as <i>Cacoecia circumclusana</i> (Christoph)
<i>Choristoneura longicellana</i> (Walsingham)	Gilligan, 2019	Gilligan, 2019	Bud, Leaf (Kuznetsov, 1988)	
<i>Cydia</i> sp.				Listed in the 2014 Work Plan
<i>Grapholita</i> * sp.				Listed in the 2014 Work Plan * Misspelled as <i>Grapholitha</i> sp. in work plan)
<i>Homonopsis foederatana</i> Kennel	Gilligan, 2019	Gilligan, 2019	Leaf (Kuznetsov, 1988)	
<i>Lobesia virulenta</i> Bae & Komai	Bae and Park, 1992	Bae and Komai, 1991	young Fruit* (Bae and Yasuda, 1992)	*External feeder
<i>Pandemis dumetana</i> (Treitschke)	Meijerman and Ulenberg, 2000	Gilligan, 2019	Leaf, Blossom (Meijerman and Ulenberg, 2000)	
<i>Pandemis heparana</i> (Denis & Schiffermüller)	Listed in 2014 Work Plan	Listed in 2014 Work Plan	Leaf (de Reede and de Wilde, 1986)	Listed in the 2014 Work Plan
<i>Rhopobota naevana</i> (Hübner)	Zhang et al., 2005	Zhang et al., 2005	Leaf, Bud (Fitzpatrick, 2006)	
<i>Tosirips perpulchranus</i> (Kennel)	Razowski, 2000	Gilligan, 2019	Leaf (Syachina and Dubatolov, 2009)	
Zygaenidae				
<i>Illiberis pruni</i> Dyar	KSPP, 1972	Chang and Lin, 1939	Leaf, Bud, Flower Bud, young Fruit (Chang and Lin, 1939)	
PLANT PATHOGENS				
BACTERIA				
<i>Erwinia pyrifoliae</i> Kim et al.	Kim et al., 2001	Geider et al., 2009	Branch (Kim et al., 1999); Fruit* (Rhim et al., 1999))	<i>E.pyrifoliae</i> blackens, and stops development of the fruit (Rhim et al., 1999).
FUNGI				

Pest name	Presence in the Republic of Korea	Host association	Plant part(s)	Notes
<i>Alternaria gaisen</i> Nagan (syn.: <i>Alternaria kikuchiana</i> Tanaka)	Andersen et al., 2001	Woudenberg et al., 2015	Leaf, Fruit (Baudry et al., 1993)	Listed in the 2014 Work Plan
<i>Botryosphaeria kuwatsukai</i> (Hara) G.Y. Sun & E. Tanaka (syn.: <i>Botryosphaeria berengeriana</i> f. sp. <i>pyricola</i> (Nose) Kogan. & Sakuma; <i>Guignardia pyricola</i> (Nose) W. Yamam; <i>Physalospora pyricola</i> Nose)	Farr and Rossman, 2019	Kobayashi, 2007	Branch, Fruit, Leaf, Trunk (Xu et al., 2015; Gu et al., 2018)	Listed in the 2014 Work Plan This fungus is reportable under the name <i>Guignardia pyricola</i> . See comments in section 2.2.
<i>Gymnosporangium unicolorne</i> H.Y. Yun	Farr and Rossman	Farr and Rossman	Leaves (Yun et al., 2009)	
<i>Monilinia fructigena</i> (Aderhold & Ruhland) Honey	Cho and Shin, 2004	Harada et al., 2004	Fruit (Harada et al., 2004)	Listed in the 2014 Work Plan
<i>Phyllactinia mali</i> (Duby) U. Braun (syn.: <i>Phyllactinia pyri</i> (Castagne) Homma)	Farr and Rossman, 2019	Kobayashi, 2007	Leaf (Kobayashi, 2007)	
<i>Venturia nashicola</i> Tanaka & Yamamoto	Schubert et al., 2003	Kobayashi, 2007	Bud (Sutton et al., 2014); Fruit (Choi et al., 2019); Leaf (Schubert et al., 2003)	

2.2. Notes on pests identified in the pest list

Botryosphaeria kuwatsukai (Hara) G.Y. Sun & E. Tanaka: References such as EFSA (2017), EPPO (2018) and CABI (2018) mention the infection of *B. kuwatsukai* in pear fruits but no primary reference was found for Japanese sand pears (*Pyrus pyrifolia*). Evidence of pathogenicity of *Botryosphaeria kuwatsukai* (*B. berengeriana* f. sp. *pyricola*) has only been reported on apples. CABI cites Kowanezawa and Sakum (1984) referring to “pear ring rot” but this is erroneous, it refers to apple ring rot. Evidence cited by CABI such as Al-Haq et al. (2002), Jones and Aldwinckle (1990), and Koganezawa and Sakum (1984), refer to apple ring rot. The only evidence of *B. kuwatsukai* being associated with *Pyrus* fruits were artificial inoculations using potato dextrose agar plugs (Gu et al., 2018). In conclusion, no evidence was found for infection of Japanese sand pears under natural conditions, and reports in CABI are referring to apples.

2.3. Pests considered but not included on the pest list

Capnophaeum fuliginoides (Rehm) W. Yamam: Cho and Shin (2004) reported this fungus to be associated with sand pears under experimental conditions. Due to the lack of evidence of infection under natural conditions, we did not include *C. fuliginoides* on the pest list.

2.3.1. Organisms with non-regulated status

We found evidence of organisms that are associated with the commodity, and are present in the export area, but are not quarantine significant for the PRA area. These organisms are listed in Appendix A.

Armored scales (Hemiptera: Diaspididae): These insects are highly unlikely to establish via fruits and vegetables intended for consumption due to their very limited ability to disperse to new host plants. For this reason, armored scales are not included in Table 1, but are included in the appendix even if they are not present in the PRA area (NIS, 2008).

3. Summary and Conclusions of Pest List

Of the organisms associated with sand pear fruit worldwide and present in the export area, we identified four organisms that are quarantine pests for the PRA area and have a reasonable likelihood of following the commodity pathway (Table 2). These pests are likely to remain associated with the commodity plant part(s) in a viable form at the time of harvest and throughout the harvesting process.

Table 2. Quarantine pest from the Republic of Korea that is not already in the the Republic of Korea Sand Pear Work Plan. This pest was identified as having a reasonable likelihood to be associated with the harvested commodity plant part and thus able to follow the pathway.

Pest type	Taxonomy	Scientific name
Arthropod	Diptera: Cecidomyiidae	<i>Resseliella yagoi</i> Yukawa and Sato

4. Literature Cited

- 7 CFR §319. 2018. U.S. Code of Federal Regulations, Title 7, Part 319 (7 CFR §319 Subpart - Plants for Planting).
- Agnello, A. M., S. M. Spangler, W. H. Reissig, D. S. Lawson, and R. W. Weires. 1992. Seasonal Development and management strategies for Comstock mealybug (Homoptera: Pseudococcidae) in New York Pear Orchards. *Journal of Economic Entomology* 85: 212-225.
- Akiratsugi, F., K. Hashimoto, H. S. Takahiro, M. Asada, R. Matsui, N. Kamiya, S. Marumaru, and Y. Nasu. 2018. A butterfly insect feeding damage a pear flower in Kyoto prefecture. *Annual Report of the Kansai Plant Protection Society* 60: 143-144.
- Al-Haq, M. I., Y. Seo, S. Oshita, and Y. Kawagoe. 2002. Disinfection effects of electrolyzed oxidizing water on suppressing fruit rot of pear caused by *Botryosphaeria berengeriana*. *Food Research International* 35:657-664.
- Alfieri, S. A., K. R. Langdon, C. Wehlburg, and J. W. Kimbrough. 1984. Index of plant diseases in Florida. Division of Plant Industry.

- Ali, M., 1978. A report on the wax scales, *Ceroplastes pseudoceriferus* Green and *Chloropulvinaria polygonata* (Ckll.) (Homoptera: Coccidae) on mango and their natural enemies. *Bangladesh Journal of Zoology* 6: 69-70.
- Andersen, B., E. Krøger, and R. G. Roberts. 2001. Chemical and morphological segregation of *Alternaria alternata*, *A. gaisen* and *A. longipes*. *Mycological Research* 105: 291-299.
- Anon. 1994. Check list of insects from Korea. Kon-Kuk University Press, The Entomological Society of Korea, Korean Society of Applied Entomology, Seoul, Korea. 744 pp.
- Aono, N. and S. Murakoshi. 1980. Investigation and control of white spotted longicorn beetle (*Anoplophora malasiaca* Thomson) which injure Japanese pear trees [*Pyrus serotina*]. *Bulletin of the Kanagawa Horticultural Experiment Station* 27: 28-34.
- APHIS 2014. Korea – Sand Pear Work Plan for Export of Sand Pear, *Pyrus pyrifolia*. Animal and Plant Health Inspection Service. 21 pgs.
- Bae, Y.-S., and F. Komai. 1991. A revision of the Japanese species of the genus *Lobesia* Guenée (Lepidoptera, Tortricidae), with description of a new subgenus. *Lepidoptera Science* 42: 115-141.
- Bae, Y.-S., and K.-T. Park. 1992. Notes on the genus *Lobesia* (Lepidoptera, Tortricidae) from Korea, with description of a new species. *Lepidoptera Science* 43: 75-82.
- Bae, Y.-S., B. Ulzijjargal, and B.-S. Park. 2013. Insect Fauna of Korea. Vol. 16, No. 11. Arthropoda: Insecta: Lepidoptera: Noctuoidea: Arctiidae Tiger Moth. National Institute of Biological Resources, Incheon. 158 pp.
- Bae, Y.-S., and T. Yasuda. 1992. The immature stages of *Lobesia* Guenée (Lepidoptera, Tortricidae) from Japan. *Lepidoptera Science* 43: 86-94.
- Bai, Q., L. Zhai, X. Chen, W. X. Xu, and G. Wang. 2015. Biological and molecular characterization of five *Phomopsis* species associated with pear shoot canker in China. *Plant Disease* 99: 1704-1712.
- Baudry, A., J. P. Morzieres, and P. Larue. 1993. First report of Japanese pear black spot caused by *Alternaria kikuchiana* in France. *Plant Disease* 77: 428.
- Biswas, G. C. 2006. Incidence and management of hairy caterpillar (*Spilarctia obliqua* Walker) on sesame. *Journal of Agriculture and Rural Development* 4: 95-100.
- Blackman, R. L. and V. F. Eastop. 1994. Aphids on the World's Trees: An Identification and Information Guide. CAB International, Wallingford. 987 pp.
- Blackman, R. L., and V. F. Eastop. 2000. Aphids on the World's Crops: An Identification and Information Guide, 2nd ed, Chichester. 466 pp.
- Bolland, H. R., J. Guitierrez, and C. H. W. Flechtmann. 1998. World Catalogue of the Spider Mite Family (Acari: Tetranychidae). E.J. Brill, Leiden. 392 pp.
- Brunt, A., A. Crabtree, M. J. Dallwitz, A. J. Gibbs, L. Watson, and E. J. Zurcher. 1996 onwards. Plant Viruses Online: Description and Lists from the VIDE Database. <http://biology.anu.edu.au/Groups/MES/vide/>.
- CABI. 2019a. *Tetranychus truncatus*. CAB International, Wallingford. <https://www.cabi.org/cpc/datasheet/53364>.
- CABI. 2019b. *Anoplophora chinensis*. CAB International, Wallingford. <https://www.cabi.org/cpc/datasheet/5556>.
- CABI. 2019c. *Aleurocanthus spiniferus*. CAB International, Wallingford. <https://www.cabi.org/cpc/datasheet/4136>.
- CABI. 2019d. *Ceroplastes japonicus*. CAB International, Wallingford. <https://www.cabi.org/cpc/datasheet/12349>.

- CABI. 2019e. *Drosophila suzukii*. CAB International, Wallingford.
<https://www.cabi.org/cpc/datasheet/109283>.
- CABI. 2019f. *Pseudomonas syringae* pv. *syringae* (bacterial canker or blast (stone and pome fruits)). <https://www.cabi.org/cpc/datasheet/45014>.
- CABI. 2019g. Apple stem grooving virus. <https://www.cabi.org/cpc/datasheet/6560>.
- CABI. 2019h. *Anthonomus pomorum* (apple blossom weevil) Page 2.
<https://www.cabi.org/cpc/datasheet/5741>.
- CABI. 2019. Crop Protection Compendium. CAB International (CABI).
<https://www.cabi.org/cpc/>. (Archived at PERAL).
- CABI/EPPO. 2018. *Metcalfa pruinosa* (Say). Distribution Maps of Plant Pests No. 529, 1st revision. CAB International, Wallingford.
- Carter, D. J., 1984. Pest Lepidoptera of Europe: With Special Reference to the British Isles. Dr. W. Junk, Dordrecht. 431 pp.
- Chang, T.-P., and C.-S. Lin. 1939. Life histories of the important insect pests of the pear trees in Ting Hsien. Peking Natural History Bulletin 13: 201-226.
- Chao, J.-T., P.W. Schaefer, Y.-B. Fan, and S.-S. Lu. 1996. Host plants and infestation of casuarina moth *Lymantria xyliana* (Lepidoptera: Lymantriidae) in Taiwan. Taiwan Journal of Forest Science 11: 23-28.
- Charles, J. G., 1982. Economic damage and preliminary economic thresholds for mealybugs (*Pseudococcus longispinus* T-T.) in Auckland vineyards. New Zealand Journal of Agricultural Research 25: 415-420.
- Chen, X., Y. Zhang, Q. Ding, G. Xue, and M. Lu. 2005. Experiment of using 0.3% Yinliansu emulsion for control of pests of fruit crops. China Fruits 6: 25-27 (abstract).
- Cho, W.-D., and H.-D. Shin. 2004. List of Plant Diseases in Korea. The Korean Society of Plant Pathology, Seoul, South Korea. 779 pp.
- Cho, Y. S., J. H. Song, H. S. Hwang, H. Jo, and C.-W. Park. 2011. Current occurrence of the major Lepidoptera pests in the oriental pear orchards in Korea. Acta Horticulturae 909: 491-496.
- Choi, J., and S. Lee. 2017. Taxonomic review of the tribe Saissetiini (Hemiptera: Coccidae) in Korea. Journal of Asia-Pacific Entomology 20: 101-111.
- Choi, E. D., G. H. Kim, S.-Y. Park, J. H. Song, Y. S. Lee, J. S. Jung, and Y. J. Koh. 2019. Genetic diversity of the pear scab fungus *Venturia nashicola* in Korea. Mycobiology 47(1):76-86.
- Choi, K. S., Y. M. Park, D. H. Kim, and D.-S. Kim. 2011. Seasonal occurrence and damage of geometrid moths with particular emphasis on *Ascotis selenaria* (Geometridae: Lepidoptera) in citrus orchards in Jeju, Korea. Korean Journal of Applied Entomology 50: 203-208.
- Choi, K. S., J. Y. Yang, Y. M. Park, S. Kim, H. Choi, D. Lyu, and D.-S. Kim. 2013. Pest lists and their damages on mango, dragon fruit and atemoya in Jeju, Korea. Korean Journal of Applied Entomology 52: 45-51.
- Chujo, M., 1954. Descriptions of a new species and a new subspecies of the genus *Lypesthes* Baly from Japan, including some notices on its two known-species (Coleoptera: Chrysomelidae, Eumolpinae). Insecta Matsumurana 18: 103-108.
- Constable, F. E., P. A. Joyce, and B. C. Rodoni. 2007. A survey key of Australian pome fruit growing districts for exotic and endemic pathogens. Australasian Plant Pathology Society 36: 165-172.

- de Reede, R.H. and H. de Wilde. 1986. Phenological models of development in *Pandemis heparana* and *Adoxophyes orana* for timing the application of Insect Growth Regulators with juvenile-hormone activity. *Entomologia Experimentalis et Applicata* 40: 151-159.
- EPPO (European Plant Protection Organization). 2005. *Lepidosaphes ussuriensis*. EPPO Bulletin 35: 429-430.
- Farr, D. F., and A. Y. Rossman. 2019. U.S. National Fungus Collections Database, ARS, USDA. United States Department of Agriculture, Agricultural Research Service. <https://nt.ars-grin.gov/fungaldatabases/>.
- Favret, C., R. L. Blackman, G. L. Miller, & B. Victor. 2016. Catalog of the Phylloxerids of the World (Hemiptera, Phylloxeridae). *ZooKeys* 629: 83-101.
- Fitzpatrick, S. M. 2006. Delayed mating reduces fecundity of blackheaded fireworm, *Rhopobota naevana*, on cranberry. *Entomologia Experimentalis et Applicata* 120: 245-250.
- Fu, M., P. W. Crous, Q. Bai, P. F. Zhang, J. Xiang, Y. S. Guo, F. F. Zhao, M. M. Yang, N. Hong, W. X. Xu, and G. P. Wang. 2018. *Colletotrichum* species associated with anthracnose of *Pyrus* spp. in China. *Persoonia* 42: 1-35.
- García Morales M, B. D. Denno, D. R. Miller, G. L. Miller, Y. Ben-Dov, and N. B. Hardy. 2016. ScaleNet: A literature-based model of scale insect biology and systematics. Database. doi: 10.1093/database/bav118. <http://scalenet.info>.
- Geider, K., G. Auling, V. Jakovljevic, and B. Volksch. 2009. A polyphasic approach assigns the pathogenic *Erwinia* strains from diseased pear trees in South Korea to *Erwinia pyrifoliae*. *Letters in Applied Microbiology* 48: 324-330.
- Gilligan, T. M. 2019. Tortricid.net. Tortricidae Resources on the Web. <http://www.tortricidae.com/>.
- Gilligan, T. M., and M. E. Epstein. 2012). TortAI: Tortricids of Agricultural Importance to the United States (Lepidoptera: Tortricidae). *Clepsis spectrana*. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Center for Plant Health Science and Technology, Identification Technology Program.
- Gomi, K. and T. Gotoh. 1996. Host plant preference and genetic compatibility of the Kanzawa spider mite, *Tetranychus kanzawai* Kishida (Acari: Tetranychidae). *Applied Entomology and Zoology* 31: 417-425.
- Gu, X., J. Zhao, H. Wang, F.-C. Lin, Q. Guo, N. Shrivastava, and R. Jeewon. 2018. ATMT transformation efficiencies with native promoters in *Botryosphaeria kuwatsukai* causing rot disease in pear. *World Journal of Microbiology and Biotechnology* 34(179):1-9.
- Haeussler, G. J. 1940. General information concerning the oriental fruit moth in Japan and Chosen. *Journal of Economic Entomology* 33: 189-193.
- Harada, Y., S. Nakao, M. Sasaki, Y. Sasaki, Y. Ichihashi, and T. Sano. 2004. *Monilia mumecola*, a new brown rot fungus on *Prunus mume* in South Korea. *Journal of General Plant Pathology* 70: 297-307.
- Higginson, A.D., M. P. Speed, and G. D. Ruxton. 2012. Effects of anti-predator defence through toxin sequestration on use of alternative food microhabitats by small herbivores. *Journal of Theoretical Biology* 300: 368-375.
- Hoebeke, E. R., A. G. Wheeler, and J. W. Brown. 2008. *Archips xylosteana* (L.) (Lepidoptera: Tortricidae), a palearctic leafroller new to North America. *Proceedings of the Entomological Society of Washington* 110: 789-795.

- Hong, E.-J., Y.-L. Jeon, J.-C. Yoon, J.-Y. Kim, M.-H. Lee, J.-W. Kim, S.-J. Park, K.-G. Kim, J.-H. Kim, and B.-J. Kim. 2012. Insect diversity of Mt. Oseosan. *Journal of Korean Nature* 5: 251-266.
- IPPC (International Plant Protection Convention). 2017. Glossary of phytosanitary terms (ISPM 5). Secretariat of the International Plant Protection Convention (IPPC), Food and Agriculture Organization of the United Nations, Rome, Italy. 38 pp.
- Jones, A. L., and H. S. Aldwinckle. 1990. *Compendium of Apple and Pear Diseases*. The American Phytopathological Society, Minnesota, United States of America. 100 pp.
- Katsumata, K. 1934. Results of studies on *Rhynchites heros* Roelofs. Ishikawa Agricultural Experiment Station. 45 pp.
- Kim, D. E., and J. Kil. 2012. A report on the occurrence of and crop damage caused by *Hyphantria cunea* (Drury) with in Korea. *Korean Journal of Applied Entomology* 51: 285-293
- Kim, D.-S. and J.-H. Lee. 2002. Egg and larval survivorship of *Carposina sasakii* (Lepidoptera: Carposinidae) in apple and peach and their effects on adult population dynamics in orchards. *Environmental Entomology* 31: 686-692.
- Kim, I.-H., J.-Y. Han, I.-S. Cho, H. Ju, J. S. Moon, E.-Y. Seo, H. G. Kim, J. Hammond, and H.-S. Lim. 2017. Generation of an infectious clone of a new Korean isolate of Apple chlorotic leaf spot virus drive by dual 35S and T7 promoters in a versatile binary vector. *Plant Pathology Journal* 33: 608-613.
- Kim, K. C., and T. S. Lee. 1986. Identification, larval host plant range, and damage of the fruit sucking moths to the major fruit in Cheonnam Province. *Korean Journal of Applied Entomology* 24: 183-190.
- Kim, W. G., S. K. Hong, and Y. S. Park. 2007. Occurrence of Anthracnose on Fruits of Asian Pear Tree Caused by *Colletotrichum acutatum*. *Mycobiology* 35: 238-240.
- Kim, W.-S., L. Gardan, S.-L. Rhim, and K. Geider. 1999. *Erwinia pyrifoliae* sp. nov., a novel pathogen that affects Asian pear trees (*Pyrus pyrifolia* Nakai). *International Journal of Systematic Bacteriology* 49: 899-906.
- Kim, W.-S., S. Jock, J.-P. Paulin, S.-L. Rhim, and K. Geider. 2001. Molecular detection and differentiation of *Erwinia pyrifoliae* and host range analysis of the Asian pear pathogen. *Plant Disease* 85: 1183-1188.
- Kirk, H., S. Dorn, and D. Mazzi. 2013. Worldwide population genetic structure of the oriental fruit moth (*Grapholita molesta*), a globally invasive pest. *BMC Ecology* 13: 1-11.
- Kobayashi, T. 2007. *Index of Fungi Inhabiting Woody Plants in South Korea - Host, Distribution and Literature*. Zenkoku-noson-kyoiku kyokai, Tsukuba, Ibaraki, South Korea. 1225 pp.
- Koganezawa, H., and T. Sakuma. 1984. Causal fungi of apple fruit rot. *Bulletin of the Fruit Tree Research Station, C* 11:49-62.
- Kohyama, T. I., K. Matsumoto, and H. Katakura. 2012. Geographic variation of host use in the leaf beetle *Agelasa nigriceps* suggests host range expansion. *Entomologia Experimentalis et Applicata* 142: 165-174.
- KSPP (Korean Society of Plant Protection). 1972. *A List of Plant Diseases, Insect Pests, and Weeds in Korea*. 424 pp.
- Kubota, S. 2010. Pest insect fauna on cherry trees and damage caused by a thysanopteran insect on cherry leaves for confectionary use. *Annual Report of the Kanto-Tosan Plant Protection Society* 57: 91-95.

- Kumata, T., H. Kuroko, and V. P. Ermolaev. 1988. Japanese species of the *Acrocercops*-group (Lepidoptera: Gracillariidae) Part 2. *Insecta Matsumurana. New Series: Journal of the Faculty of Agriculture, Hokkaido University, Series Entomology* 40: 1-133.
- Kuznetsov, V. I. 1988. Leaf-rollers (Lepidoptera: Tortricidae) of the southern part of the Soviet Far East and their seasonal cycles, pp. 57-249 in Kryzhanovskii, O. L. (ed.), *Lepidoptera Fauna of the USSR and Adjacent Countries: A Collection of Papers Dedicated to Professor Aleksander Sergeevich Danailevskii*. Smithsonian Institution Libraries, Washington, DC. 405 pp.
- Kwon, G.-M., S.-H. Lee, M.-J. Han, and H.-G. Goh. 2002. The genus *Pseudococcus* (Westwood)(Sternorrhyncha: Pseudococcidae) of Korea. *Journal of Asia-Pacific Entomology* 5: 145-154.
- Lee, D.-H., B. D. Short, S. V. Joseph, J. C. Bergh, and T. C. Leskey. 2013. Review of the biology, ecology, and management of *Halyomorpha halys* (Hemiptera: Pentatomidae) in China, Japan, and the Republic of Korea. *Environmental Entomology* 42: 627-641.
- Lee, J.-e. 2012. *Insect Fauna of Korea. Vol. 12, No. 6. Arthropoda: Insecta: Coleoptera: Chrysomelidae (Larvae)–Leaf Beetles (Larvae)*. National Institute of Biological Resources, Incheon. 133 pp.
- Lee, J. H., J. K. Park, D. H. Lee, J. Y. Uhm, S. Y. Ghim, and J. Y. Lee. 2001. Occurrence of *Apple scar skin viroid*-Korean strain (ASSVd-K) in apples cultivated in Korea. *Plant Pathology Journal* 17: 300-304.
- Lee, K.-S., T. H. Kang, J. W. Jeong, D. P. Ryu, and H.-S. Lee. 2015. Taxonomic review of the genus *Lymantria* (Lepidoptera: Erebidae: Lymantriinae) in Korea. *Entomological Research* 45: 225-234.
- Lee, Y. J. 2008. Revised synonymic list of Cicadidae (Insecta: Hemiptera) from the Korean Peninsula, with the description of a new species and some taxonomic remarks. *Proceedings of the Biological Society of Washington* 121: 445-467.
- Lim, J., S.-Y. Jung, J.-S. Lim, J. Jang, K.-M. Kim, Y.-M. Lee, and B.-W. Lee. 2014. A review of host plants of Cerambycidae (Coleoptera: Chrysomeloidea) with new host records for fourteen cerambycids, including the Asian longhorn beetle (*Anoplophora glabripennis* Motschulsky), in Korea. *Korean Journal of Applied Entomology* 53: 111-133.
- Liu, Y.-s. 2001. Studies on developing law and controlling technology of *Janus piri*. *Journal of Zhejiang Forestry Science and Technology* 21: 47-48, 64.
- Maier, C. T. 2003. Distribution, hosts, abundance, and seasonal flight activity of the exotic leafroller, *Archips fuscocupreanus* Walsingham (Lepidoptera: Tortricidae), in the northeastern United States. *Annals of the Entomological Society of America* 96: 660-666.
- Mazzeo, G., S. Nucifora, A. Russo, P. Suma, and S. Longo. 2016. An updated list of the scale insect (Hemiptera Coccoomorpha) fauna of some Sicilian endemic plants. *Redia* 99: 201-206.
- Meijerman, L., and S. A. Ulenberg. 2000. *Arthropods of Economic Importance: Eurasian Tortricidae*. University of Amsterdam, Amsterdam. CD ROM.
- Migeon, A., and F. Dorkeld. 2019a. Spider Mites Web: *Tetranychus truncatus*. <http://www1.montpellier.inra.fr/CBGP/spmweb/notespecies.php?id=921>.
- Migeon, A., and F. Dorkeld. 2019b. Spider Mites Web: *Tetranychus kanzawai*. <http://www1.montpellier.inra.fr/CBGP/spmweb/notespecies.php?id=1023>.

- Morishita, M., 2005. Resurgence of Japanese mealybug, *Planococcus kraunhiae* (Kuwana), in persimmon induced by a synthetic pyrethroid cypermethrin. Annual Report of The Kansai Plant Protection Society 47; 125-126.
- Moriyama, M. and H. Numata . 2008. Diapause and prolonged development in the embryo and their ecological significance in two cicadas, *Cryptotympana facialis* and *Graptopsaltria nigrofuscata*. Journal of Insect Physiology 54: 1487-1494.
- NAPIS (National Agricultural Pest Information System). 2013a. Pest Tracker: Fall Webworm, *Hyphantria cunea*. 4 pp.
- NAPIS (National Agricultural Pest Information System). 2013b. Pest Tracker: Oriental Fruit Moth (OFM), *Grapholita molesta*. National Agricultural Pest Information System. 6 pp.
- Nielsen, A. L., and G. C. Hamilton. 2009. Life history of the invasive species *Halyomorpha halys* (Hemiptera: Pentatomidae) in northeastern United States. Annals of the Entomological Society of America 102: 608-616.
- NIS (National Identification Services). 2008. Change in action status for armored scales (Hemiptera: Diaspididae) on material for consumption (NIS action policy, March 25, 2008). United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, National Identification Services (NIS). 2 pp.
- Nishida, R., 1994/1995. Sequestration of plant secondary compounds by butterflies and moths. Chemoecology 5: 127-138.
- Nohara, K., S.-i. Nakao, and A. Nagatomi. 2000. A study of the relationship between pesticide treatment and the fauna in citrus groves on Nagashima Island, Kagoshima Prefecture. Applied Entomology and Zoology 35: 271-281.
- O'Brien, P. J., Y. A. Abdel-Aal, J. A. Ottea, and J. B. Graves. 1992. Relationship of insecticide resistance to carboxylesterases in *Aphis gossypii* (Homoptera: Aphididae) from midsouth cotton. Journal of Economic Entomology 85: 651-657.
- Ohkubo, N. 1995. Host plants of yellow tea thrips, *Scirtothrips dorsalis* Hood and annual occurrence on them. Bulletin of the Nagasaki Fruit Tree Experimental Station 2: 1-15.
- Ôtake, T. 1992. Oviposition behavior of *Nippolachnus piri* Matsumura (Hemiptera: Aphididae: Lachninae) on *Rhaphiolepis umhellata* Makino var. *integerrima* Rehder, a winter host of the aphid. Applied Entomology and Zoology 27: 413-419.
- Otani, H., K. Kohmoto, S. Nishimura, T. Nakashima, T. Ueno, and H. Fukami. 1985. Biological Activities of AK-Toxins I and II, Host-Specific Toxins from *Alternaria alternata* Japanese Pear Pathotype. Annals of the Phytopathological Society of Japan 51: 285-293.
- Park, D.-S., Y. J. Leem, K.-W. Hahn, S.-J. Suh, K.-J. Hong, and H.-W. Oh. 2010. Molecular identification of mealybugs (Hemiptera: Pseudococcidae) found on Korean pears. Journal of Economic Entomology 103: 25-33.
- Park, I.-K., S.-G. Lee, S.-C. Shin, C.-S. Kim, and Y.-J. Ahn. 2004. Feeding and attraction of *Agelastica coerulea* (Coleoptera: Chrysomelidae) to Betulaceae plants. Journal of Economic Entomology 97: 1978-1982.
- Park, J. D. and K. H. Hong. 1992. Species, damage and population density of Pseudococcidae injuring pear fruits. Korean Journal of Applied Entomology 31: 133-138.
- Park, J. Y. and J. E. Lee. 2003. Immature stages of *Paropsides duodecimpustulatus* (Gebler) (Coleoptera: Chrysomelidae, Chrysomelidae) from Korea. Entomological Research, 33: 253-255.
- Park, K.-T., S.-S. Kim, Y. A. Tshistjakov, and Y.-D. Kwon. 1999. Illustrated Catalogue of Moths in Korea. I. Sphingidae, Bombicoidea, Notodontidae. Junghaeng-Sa, Seoul. 358 pp.

- Patti, I. and S. Barbagallo. 2016. Notizie sulla presenza in Sicilia della fillossera del pero, *Aphanostigma piri* (Chol.) (Homoptera, Aphidoidea, Phylloxeridae). *Entomologica* 13: 47-56.
- Pittaway, A. R. and I. J. Kitching. 2019. *Marumba gaschkewitschii gaschkewitschii* (Bremer & Grey, 1853). Sphingidae of the Eastern Palaearctic (including Siberia, the Russian Far East, Mongolia, China, Taiwan, the Korean Peninsula and Japan.). The Natural History Museum, London. http://tpittaway.tripod.com/china/m_gas.htm.
- Pucat, A. M., and J. A. Garland. 1996. *Tetranychus viennensis*, Hawthorn Spider Mite. Canadian Food Inspection Agency - Plant Pest Information. 2 pp.
- Rahman, M. Z., S. Uematsu, M. D. Coffey, S. Uzuhashi, H. Suga, and K. Kageyama. 2014. Re-evaluation of Japanese Phytophthora isolates based on molecular phylogenetic analyses. *Mycoscience* 55: 314-327.
- Razowski, J. 2000. Tortricidae (Lepidoptera) collected in Taiwan, with description of one new genus and eight new species, and a comparison with some regional faunas. *Zoological Studies* 39: 319-327.
- Rhim, S.-L., B. Volksch, L. Gardan, J.-P. Paulin, C. Langlotz, W.-S. Kim, and K. Geider. 1999. *Erwinia pyrifoliae*, an *Erwinia* species different from *Erwinia amylovora*, causes a necrotic disease of Asian pear trees. *Plant Pathology* 48: 514-520.
- Robinson, G. S., P. R. Ackery, I. J. Kitching, G. W. Beccaloni, and L. M. Hernández, 2010. HOSTS - A Database of the World's Lepidopteran Hostplants. Natural History Museum, London. <http://www.nhm.ac.uk/our-science/data/hostplants/search/list.dsml>
- Sandhu, G. S. and A.S. Sohi. 1986. Insects and other pests of sand pear and their control in the Punjab. *Punjab Horticultural Journal* 26: 46-55.
- Santas, L. A. 1987. The predators' complex of pear-feeding psyllids in unsprayed wild pear trees in Greece. *Entomophaga* 32: 291-297.
- Savela, M. 2019. Larval food plant information sorted by plant: *Aporia crataegi* (Linnaeus, 1758). Lepidoptera and Some Other Life Forms Checklist; <http://www.nic.funet.fi/pub/sci/bio/life/insecta/lepidoptera/ditrysia/papilionoidea/pieridae/pierinae/aporia/#crataegi>.
- Schubert, K., A. Ritschel, and U. Braun. 2003. A monograph of *Fusicladium* s. lat. (Hyphomycetes). *Schlechtendalia* 9: 1-132.
- Seal, D. R., W. Klassen, and V. Kumar. 2010. Biological parameters of *Scirtothrips dorsalis* (Thysanoptera: Thripidae) on selected hosts. *Environmental Entomology* 39: 1389-1398.
- Seo, B. Y., J. K. Jung, C.-G. Park, S.-G. Lee, and Y.-L. Park. 2016. Plant penetration activities by the flatid planthopper *Metcalfa pruinosa* (Hemiptera: Fulgoroidea): an electrical penetration graph-histology analysis. *Journal of Applied Entomology* 140: 706-714.
- She, D., F. Fu, F. Chen, C. Zhou, and G. Ma. 2005. The occurrence of diseases and pests on the trunk and branches of Yunhexueli pear cultivar and their control. *South China Fruits* 4: 66-68. (abstract).
- Shen, T.-C., Y.-S. Shae, C.-S. Liu, W.-W. Tan, and S.-Y. Hwang. 2003. Relationships between egg mass size and egg number per egg mass in the casuarina moth, *Lymantria xyliana* (Lepidoptera: Lymantriidae). *Environmental Entomology* 32: 752-755.
- Song, J.-H., Y.-S. Cho, J.-H. Park, and H.-s. Hwang. 2011. Current status of organic cultivation in oriental pear orchards of Korea, pp 495-498 in Neuhoff, D., S.M. Sohn, C. Ssekyewa, N. Halberg, I.A. Rasmussen, and J. Hermansen (eds.). *Organic is Life: Knowledge for Tomorrow* (Proceedings of the Third Scientific Conference of the International Society of

- Organic Agriculture Research [ISO FAR], Namyangju, Republic of Korea, September 28-October 1, 2011). Vol. 1. Organic Crop Production. International Society of Organic Agriculture Research. Bonn.
- Song, J.-H., Md. A. Alim, E.-D. Choi, D.-S. Choi, and H.-J. Seo. 2018. Screening of essential oil repellents against the organic pear pest *Holotrichia parallela* (Coleoptera: Scarabaeidae). Korean Journal of Organic Agriculture 26: 259-268.
- Sony, S., M. A. Alim, S. Kim, M. Kwon, D. Lee, and Y. Kim. 2009. Diagnostic molecular markers of six lepidopteran insect pests infesting apples in Korea. Journal of Asia-Pacific Entomology 12: 107-111.
- Sugie, H., Y. Tamaki, R. Sato, and M. Kumakura. 1984. Sex pheromone of the peach leafminer moth, *Lyonetia clerkella* Linné: Isolation and identification. Applied Entomology and Zoology 19: 323-330.
- Sugie, H., M. Yoshida, K. Kawasaki, H. Noguchi, S. Moriya, K. Takagi, H. Fukuda, A. Fujiie, M. Yamanaka, Y. Ohira, and T. Tsutsumi. 1996. Identification of the aggregation pheromone of the brown-winged green bug, *Plautia stali* Scott (Heteroptera: Pentatomidae). Applied Entomology and Zoology 31: 427-431.
- Sugie, H., K. Yaginuma, and Y. Tamaki. 1977. Sex pheromone of the asiatic leafroller, *Archippus breviplicanus* Walsingham (Lepidoptera: Tortricidae): isolation and identification. Applied Entomology and Zoology 12: 69-74.
- Sutton, T. B., H. S. Aldwinckle, A. M. Agnello, and J. F. Walgenbach (eds.). 2014. Compendium of Apple and Pear Diseases and Pests. American Phytopathological Society, St. Paul. 218 pp.
- Srigiriraju, L., P. J. Semtner, and J. R. Bloomquist. 2010. Monitoring for imidacloprid resistance in the tobacco-adapted form of the green peach aphid, *Myzus persicae* (Sulzer) (Hemiptera: Aphididae), in the eastern United States. Pest Management Science 66: 676-685.
- Syachina, A. A., and V. V. Dubatolov. 2009. Contribution to the knowledge of the leaf-rollers (Lepidoptera, Tortricidae) of the lower Amur area. Entomological Review 89: 545-553.
- Takada, H. 1988. Interclonal variation in the photoperiodic response for sexual morph production of Japanese *Aphis gossypii* Glover (Hom., Aphididae). Journal of Applied Entomology 106: 188-197.
- Takemoto, S., H. Nakamura, A. Sasaki, and T. Shimane. 2009. *Rosellinia compacta*, a new species similar to the white root rot fungus *Rosellinia necatrix*. Mycologia 101: 84-94.
- Tashiro, N., K. Manabe, and Y. Ide. 2012. Emergence and frequency of highly benzimidazole-resistant *Colletotrichum gloeosporioides*, pathogen of Japanese pear anthracnose, after discontinued use of benzimidazole. Journal of General Plant Pathology 78: 221-226.
- Tayutivutikul, J. and K. Kusigemati. 1992. Biological studies of insects feeding on the kudzu plant, *Pueraria lobata* (Leguminosae) I. List of feeding species. Memoirs of the Faculty of Agriculture, Kagoshima University 28: 89-124.
- Umeya, K., and T. Okada (eds.). 2003. Agricultural Insect Pests in Japan. Zenkoku Nōson Kyōiku Kyōkai Tokyo. 1203 pp.
- Vang, L. V., H. N. Thuy, C. N. Q. Khanh, P. K. Son, Q. Yan, M. Yamamoto, U. Jinbo, and T. Ando. 2013. Sex pheromones of three citrus leafrollers, *Archips atrolucens*, *Adoxophyes privatana*, and *Homona* sp., inhabiting the Mekong Delta of Vietnam. Journal of Chemical Ecology 39: 783-789.

- Walker, K. 2006. Pests and Diseases Image Library (PaDIL): *Acrobasis pyrivorella*.
<http://www.padil.gov.au/viewPest.aspx?id=512>
- Woudenberg, J. H. C., M. F. Seidl, J. Z. Groenewald, M. Vries, J. B. Stielow, B. P. H. J. Thomma, and P. W. Crous. 2015. *Alternaria* section *Alternaria*: Species, *formae speciales* or pathotypes? *Studies in Mycology* 81: 1-21.
- Wu, Y., J. J. Molongoski, D. F. Winograd, S. M. Bogdanowicz, A. S. Louyakis, D. R. Lance, V. C. Mastro, and R. G. Harrison. 2015. Genetic structure, admixture and invasion success in a Holarctic defoliator, the gypsy moth (*Lymantria dispar*, Lepidoptera: Erebidae). *Molecular Ecology* 24: 1275-1291.
- Wu, Z.-B., H.-M. Ku, Y.-K. Chen, C.-J. Chang, and F.-J. Jan. 2010. Biological and molecular characterization of apple chlorotic leaf spot virus causing chlorotic leaf spot on pear (*Pyrus pyrifolia*) in Taiwan. *HortScience* 45: 1073-1078.
- Xu, C., C. Wang, L. Ju, R. Zhang, A. R. Biggs, E. Tanaka B. Li, and G. Sun. 2015. Multiple locus genealogies and phenotypic characters reappraise the causal agents of apple ring rot in China. *Fungal Diversity* 71: 215-231.
- Xu, C. Z.-d. Yang, and Y.-q. He. 2007. Observation for biological characteristics and control of *Bacchisa fortunei*. *Journal of Northwest Forestry University* 5: 28. (abstract).
- Xu, L. H., G. L. Xie, B. Li, B., Zhu, F. S. Xu, and J. Qian. 2008. First report of pear blossom blast caused by *Pseudomonas syringae* pv. *syringae* in China. *Plant Disease* 92: 832.
- Yamada, K. and T. Tutumi. 1989. Control of the large cicade (*Graptosaltria nigrofuscata* Motschulsky) by pyrethroids in Japanese pear orchards. *Proceedings of the Association for Plant Protection of Kyushu* 35: 154-156.
- Yamakawa, R., Y. Takubo, K. Ohbayashi, H. Naka, and T. Ando. 2012. Female sex pheromone of *Cystidia couaggaria couaggaria* (Lepidoptera: Geometridae): Identification and field attraction. *Bioscience, Biotechnology, and Biochemistry* 76: 1303-1307.
- Yoon, J. K. and D. K. Lee. 1974. Studies on pear phylloxera (*Aphanostigma iakusuiense* Kishida). (1) On the control methods. *Korean Journal of Plant Protection* 13: 209-216.
- Yukawa, J., S. Sato, K. M. Harris, M. Tokuda, M. Sasaki, A. Arakawa, K. Nakada, and N. Sawamura. 2009. A new species of *Resseliella* (Diptera: Cecidomyiidae) infesting Japanese pear, *Pyrus pyrifolia* (Rosaceae). *Applied Entomology and Zoology* 44: 655-666.
- Yun, H., S. Hong, A. Y. Rossman, S. Lee, K. J. Lee, and K. S. Bae. 2009. The rust fungus *Gymnosporangium* in Korea including two new species, *G. monticola* and *G. unicornae*. *Mycologia* 101: 790-809.
- Zhang, A., H. Li, and S. Wang. 2005. Study on the genus *Rhopobota* Lederer from China (Lepidoptera: Tortricidae: Olethreutinae). *Entomologica Fennica* 16: 273-286.
- Zhang, X., H.-h. Zhu, C. Wei, and Z.-z. Ren. 2014. Ovipositing habit of *Cryptotympana atrata* (Fabricius) (Hemiptera: Cicadidae) on four host plants. *Southwest China Journal of Agricultural Sciences* 27: 132-135.
- Zhu, L. W., X. M. Tang, T. Y. Lin, S. S. Zhou, P. Liu, Z. F. Ye, D. S. Wang, and Z. Y. Wu. 2016. First report of *Fusarium* root rot in Asian pear caused by *Fusarium solani* in China. *Plant Disease* 101: 252.

5. Appendix: Pests with non-quarantine status

We found some evidence of the below-listed organisms being associated with sand pear and being present in the Republic of Korea. Because these organisms are not regulated for the United States, or as defined by ISPM 5, IPPC, (2017), we did not list them in Table 1 of this pest list. For organisms **not** present in the United States, we also provide justification for their non-actionable status.

Organism	In the Republic of Korea	In U.S.	Host association	Notes
ACARI				
Tetranychidae				
<i>Bryobia praetiosa</i> Koch	Bolland et al., 1998	Bolland et al., 1998	Sandhu and Sohi, 1986	
<i>Panonychus citri</i> (McGregor)	Bolland et al., 1998	Bolland et al., 1998	Bolland et al., 1998	
<i>Tetranychus kanzawai</i> Kishida	Migeon and Dorkeld, 2019b	Migeon and Dorkeld, 2019b	Gomi and Gotoh, 1996	
INSECTA				
DIPTERA				
Drosophilidae				
<i>Drosophila suzukii</i> Matsumura	CABI, 2019e	CABI, 2019e	CABI, 2019e	
HEMIPTERA				
Aphididae				
<i>Aphis gossypii</i> Glover	Takada, 1988	O'Brien et al., 1992	Takada, 1988	
<i>Myzus persicae</i> (Sulzer)	Anon., 1994	Srigiriraju et al., 2010	Blackman and Eastop, 2000	
<i>Toxoptera citricida</i> (Kirkaldy)	KSPP, 1972	Blackman and Eastop, 2000	Blackman and Eastop, 2000	
Coccidae				
<i>Parthenolecanium corni</i> (Bouché)	Choi and Lee, 2017	García Morales et al., 2016	Choi and Lee, 2017	
Diaspididae				
<i>Comstockaspis perniciosus</i> (Comstock) (syn.: <i>Quadraspidiotus perniciosus</i> (Comstock))	García Morales et al., 2016	García Morales et al., 2016	Sandhu and Sohi, 1986	
<i>Lepidosaphes ussuriensis</i> (Borchsenius)	García Morales et al., 2016	No	(EPPO, 2005)	
<i>Pseudaulacaspis pentagona</i> (Targioni Tozzetti)	García Morales et al., 2016	García Morales et al., 2016	García Morales et al., 2016	
Flatidae				
<i>Metcalfa pruinosa</i> (Say)	Seo et al., 2016	CABI/EPPO, 2018	Seo et al., 2016	
Pentatomidae				
<i>Halyomorpha halys</i> (Stål)	Lee et al., 2013	Nielsen and Hamilton, 2009	Lee et al., 2013	
Pseudococcidae				

Organism	In the Republic of Korea	In U.S.	Host association	Notes
<i>Pseudococcus comstocki</i> (Kuwana)	Park et al., 2010	García Morales et al., 2016	Park et al., 2010	
LEPIDOPTERA				
Arctiidae				
<i>Hyphantria cunea</i> (Drury)	Kim and Kil, 2012	NAPIS, 2013a	Kim and Kil, 2012	
Tortricidae				
<i>Archips fuscocupreanus</i> Walsingham	Gilligan, 2019	Maier, 2003	Gilligan, 2019	
<i>Grapholita molesta</i> Busk	Kirk et al., 2013	NAPIS, 2013b	Haeussler, 1940	
THYSANOPTERA				
Thripidae				
<i>Scirtothrips dorsalis</i>	Hood Choi et al., 2013	Seal et al., 2010	Ohkubo, 1995	
PLANT PATHOGENS				
BACTERIA				
<i>Pseudomonas syringae</i> pv. <i>syringae</i> van Hall		CABI, 2019f	Xu et al., 2008	
FUNGI				
<i>Alternaria alternata</i> (Fr.) Keissl.	Farr and Rossman, 2019	Otani et al., 1985	Farr and Rossman, 2019	
<i>Armillaria mellea</i> (Vahl) Fr.) P. Kumm.	Farr and Rossman, 2019	Farr and Rossman, 2019	Kobayashi, 2007	
<i>Armillaria tabescens</i> (Scop.) Dennis, P.D. & Hora	Farr and Rossman, 2019	Farr and Rossman, 2019	Alfieri et al., 1984	
<i>Botryosphaeria dothidea</i> (Mougeot et Fries) Cesati & De Notaris	Farr and Rossman, 2019	Otani et al., 1985	Farr and Rossman, 2019	
<i>Botryosphaeria parva</i> Pennycook & Samuels (syn.: <i>Neofusicoccum parvum</i> (Pennycook & Samuels) Crous, Slippers & A.J.L. Phillips)	Farr and Rossman, 2019	Farr and Rossman, 2019	Farr and Rossman, 2019	
<i>Botrytis cinerea</i> Pers.: Fr.	Farr and Rossman, 2019	Farr and Rossman, 2019	Farr and Rossman, 2019	
<i>Colletotrichum acutatum</i> Simmonds ex Simmonds	Farr and Rossman, 2019	Farr and Rossman, 2019	Kim et al., 2007	
<i>Colletotrichum fioriniae</i> (Marcelino & Gouli) R.G. Shivas & Y.P. Tan	Farr and Rossman, 2019	Farr and Rossman, 2019	Fu et al., 2018	
<i>Diaporthe eres</i> Nitschke (syn.: <i>Phomopsis fukushii</i> Tanaka & Endo)	Farr and Rossman, 2019	Farr and Rossman, 2019	Bai et al., 2015	
<i>Fusarium solani</i> (Mart.) Sacc.	Farr and Rossman, 2019	Farr and Rossman, 2019	Zhu et al., 2016	
<i>Glomerella cingulata</i> (Stoneman) Spaulding & H. Schrenk	Farr and Rossman, 2019	Farr and Rossman, 2019	Tashiro et al., 2012	

Organism	In the Republic of Korea	In U.S.	Host association	Notes
(syn.: <i>Colletotrichum gloeosporioides</i> (Penz.) Penz. & Sacc.)				
<i>Gymnosporangium asiaticum</i> Miyabe ex G. Yamada	Farr and Rossman, 2019	Farr and Rossman, 2019	Cho and Sin, 2004	
<i>Lasiodiplodia theobromae</i> (Pat.) Griffiths & Maubl.	Farr and Rossman, 2019	Farr and Rossman, 2019	Cho and Shin, 2004	
<i>Mycopappus alni</i> (Dearn. & Barthol.) Redhead & G.P. White (syn.: <i>Cercospora alni</i> Dearn. & Barthol.)	Lee et al., 2013	Farr and Rossman, 2019	Lee et al., 2013	
<i>Monilinia fructicola</i> (Winter) Honey	Farr and Rossman, 2019	Farr and Rossman, 2019	Farr and Rossman, 2019	
<i>Penicillium expansum</i> Link	Farr and Rossman, 2019	Farr and Rossman, 2019	Farr and Rossman, 2019	
<i>Phytophthora cactorum</i> (Lebert & Cohn) J. Schroter	Cho and Shin, 2004	Farr and Rossman, 2019	Rahman et al., 2014	
<i>Phytophthora syringae</i> (Klebann) Klebahn	Cho and Shin, 2004	Farr and Rossman, 2019	Kobayashi, 2007	
<i>Rhizopus stolonifer</i> (Ehrenberg) Vuillemin var. <i>stolonifer</i>	Farr and Rossman, 2019	Farr and Rossman, 2019	Farr and Rossman, 2019	
<i>Rosellinia necatrix</i> Prill.	Farr and Rossman, 2019	Farr and Rossman, 2019	Takemoto et al., 2009	
<i>Sclerotinia sclerotiorum</i> (Libert) de Bary	Cho and Shin, 2004	Farr and Rossman, 2019	Cho and Shin, 2004	
<i>Trichothecium roseum</i> (Persoon) Link	Cho and Shin, 2004	Farr and Rossman, 2019	Cho and Shin, 2004	
<i>Zygothia jamaicensis</i> E.W. Mason (syn.: <i>Schizothyrium jamaicense</i> (E.W. Mason) Rossman)	Cho and Shin, 2004	Farr and Rossman, 2019	Cho and Shin, 2004	
VIROUSES and VIROIDS				
<i>Apple scar skin viroid</i>	Lee et al., 2001	Constable et al., 2007	Constable et al., 2007	
<i>Apple chlorotic leaf spot virus</i>	Kim et al., 2017	Constable et al., 2007	Wu et al., 2010	
<i>Apple stem grooving virus</i>	CABI, 2019g	Constable et al., 2007	Constable et al., 2007	
<i>Apple stem pitting virus</i>	Brunt et al., 1996 onwards	Brunt et al., 1996 onwards	Wu et al., 2010	
<i>Apple mosaic virus</i>	Kim et al., 2017	Constable et al., 2007	Constable et al., 2007	