Importation of Grapes

(*Vitis* spp.)

from Korea into the United States

A Qualitative, Pathway-Initiated Pest Risk Assessment

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A. Introduction

The Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA) prepared this pest risk assessment to examine plant pest risks associated with the importation into the United States of **fresh grapes (*Vitis* spp.) grown in Korea**. This is a qualitative pest risk assessment in which estimates of risk are expressed in qualitative terms such as high or low rather than in numerical terms such as probabilities or frequencies. The details of methodology and rating criteria can be found in: Pathway-Initiated Pest Risk Assessment: Guidelines for Qualitative Assessments, version 5.0 (USDA, 2000), available at the address named on the front of this document.

International plant protection organizations such as the North American Plant Protection Organization (NAPPO) and the International Plant Protection Convention (IPPC) of the United Nations Food and Agriculture Organization (FAO) provide guidance for conducting pest risk analyses. The methods used to initiate, conduct, and report this pest risk assessment are consistent with guidelines provided by NAPPO, IPPC and FAO. The use of biological and phytosanitary terms conforms with the NAPPO Compendium of Phytosanitary Terms (Hopper, 1996) and the Definitions and Abbreviations (Introduction Section) in International Standards for Phytosanitary Measures, Section 1—Import Regulations: Guidelines for Pest Risk Analysis (FAO 1996).

B. Risk Assessment

1. Initiating Event: Proposed Action

This pest risk assessment is commodity-based, and therefore "pathway-initiated." The assessment is in response to a request for USDA authorization to allow imports of a particular commodity presenting a potential plant pest risk. In this case, the importation into the United States of **fresh grapes (*Vitis* spp.) grown in Korea** is a potential pathway for introduction of plant pests. Title 7 of the Code of Federal Regulations 319, Part 56 (7CFR §319.56) provides regulatory authority for the importation of fruits and vegetables from foreign sources into the United States.

2. Assessment of Weediness Potential of Grape, *Vitis* spp.

The results of the weediness screening for *Vitis vinifera* (Table 1) did not prompt a pest-initiated risk assessment.

Table 1: Process for Determining Weediness Potential of Commodity

Commodity: *Vitis vinifera* L. (Vitaceae) Cultivated grape.

Phase 1: *Vitis vinifera* L. is widely cultivated in the United States.

Phase 2: Is the genus or species or subspecies or variety listed as a weed in:

NO	Geographical Atlas of World Weeds (Holm *et al.*, 1979) or World Weeds: Natural Histories and Distribution. (Holm *et al.*, 1997)
NO	World's Worst Weeds (Holm *et al*., 1977)
NO	Report of the Technical Committee to Evaluate Noxious Weeds; Exotic Weeds for Federal Noxious Weed (Gunn and Ritchie, 1982)
NO	Economically Important Foreign Weeds (Reed, 1977)
Yes*	Weed Science Society of America list (WSSA, 1989)
NO	Is there any literature reference indicating weediness (*e.g.*, AGRICOLA, CAB, Biological Abstracts, AGRIS; search on "species name" combined with "weed").

Phase 3: Conclusion: Certain species of *Vitis* have been reported as weeds (WSSA, 1989). However, as *Vitis* is widely cultivated in the United States, additional imports would be unlikely to pose a weed risk.

* already widespread.

3. Previous Risk Assessments, Current Status and Pest Interceptions

Decision History for *Vitis* spp.:

1958 - Korea: Denied entry to California and North Pacific because of an absence of Korean Grape diseases and an appreciable risk of serious pests hitch-hiking with the commodity.
1973 - Korea: Denied entry into Hawaii because of insects of economic importance occurring in Korea.

Pest Interceptions from Korea for FY 1985-99 for Grapes:

Origin	Pest	Host listed	# of Times Intercepted/where found
Korea	Cerambycidae, sp. of	Vitis spp.	3 / maritime cargo inspection

4. Pest Categorization - Identification of Quarantine Pests and Quarantine Pests Likely to Follow the Pathway

Table 2 shows the pest list for *Vitis* spp. from Korea. The tables were developed after a review of some of the information sources listed in (USDA, 2000). The list summarizes information on the distribution of each pest, pest-commodity association, and regulatory history.

Table 2: Pests of *Vitis* spp. in Korea

Pest	Geographic Distribution[0]	Plant Part Affected	Quarantine Pest	Likely to Follow Pathway	References
Aboridia apicalis (Nawa) (Homoptera: Cicadellidae)	KR	L	Y	N	Hong, 1995; Metcalf, 1968
Acosmeryx naga (Moor) (Lepidoptera: Sphingidae)	KR	L	Y	N	Anon, 1986
Acronicta rumicis (L.) (Lepidoptera: Noctuidae)	KR	L	Y	N	Hong, 1995; Lee, *et al.*, 1970; Poole, 1989
Acrothinium gaschevitchii (Motshulsky) (Coleoptera: Chrysomelidae)	KR	L	Y	N	Hong, 1995
Adoretus sinicus Burmeister (Coleoptera: Scarabaeidae)	KR	L	Y_b	N	APPPC, 1987; CPC, 1999; EPPO, 1999
Adoretus tenuimaculatus Waterhouse (Coleoptera: Scarabaeidae)	KR	L	Y	N	Hong, 1995; Kim, *et al*, 1986; Shiraki, 1952
Adris tyrannus amurensis Staudinger (Lepidoptera: Noctuidae)	KR	F_a	Y	N_1	Hong, 1995; Lee, *et al.*, 1970; Pittaway, 1995; Zhang, 1994
Agrius convolvuli (L.) (Lepidoptera: Sphingidae)	KR	L	Y_b	N	Chu and Wang, 1980; Hong, 1995
Agrotis ipsilon (Hufnagel) (Lepidoptera: Noctuidae)	KR, US	F_a, W	N_c	N_1	CIE, 1969; CPC, 1999; Lee *et al*., 1970; Zhang, 1994
Agrotis segetum Denis & Schiffermuller (Lepidoptera: Noctuidae)	KR	S	Y	N	CPC, 1999; Zhang, 1994
Aleurocanthus spiniferus (Quaintance) (Homoptera: Aleyrodidae)	KR, US (HI)	L, S	Y_b	N	CIE 112; EPPO, 1999; Hong, 1995; PNKTO, Shiraki, 1952
Ambrosiodmus rubricollis (Eichoff) (Coleoptera: Scolytidae)	KR, US	W	N	N	Choo, *et al.*, 1983; Wood, 1982
Ampelophaga rubiginosa Bremer & Grey (Lepidoptera: Sphingidae)	KR	L	Y_b	N	Clausen, 1931; Hong, 1995; Kim *et al*., 1982

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Amphipyra erebina Butler (Lepidoptera: Noctuidae)	KR	L	Y	N	Hong, 1995; Poole, 1989
Amphipyra livida Denis & Schiffermuller (Lepidoptera: Noctuidae)	KR	F_a, L	Y	N_1	Hong, 1995; Musich, 1976; Poole, 1989; Yoon and Lee, 1974; Zhang, 1994
Amphipyra pyramidea (L.) (Lepidoptera: Noctuidae)	KR	L	Y_b	N	Hong, 1995; Poole, 1989; Zhang, 1994
Anomala cuprea Hope (Coleoptera: Scarabaeidae)	KR	L, R	Y	N	Akutsu, 1991; Anon, 1986; Fujiyama, *et al*, 1983; Hong, 1995; Yoshida, *et al.*, 1979
Anomala geniculata Motschulsky (Coleoptera: Scarabaeidae)	KR	L, R	Y	N	Hong, 1995; Tanaka, 1979
Anomala japonica Arrow (Coleoptera: Scarabaeidae)	KR	L, R	Y	N	Hong, 1995
Anomala luculenta Erichson (Coleoptera: Scarabaeidae)	KR	L, R	Y	N	Hong, 1995
Anomala octiescostata Burmeister (Coleoptera: Scarabaeidae)	KR	L, R	Y	N	Anon, 1986
Anomala orientalis (Waterhouse) (Coleoptera: Scarabaeidae)	KR , US	L, R	N_c	N	EPPO, 1999; FAO, 1954; Hong, 1995; Metcalf and Metcalf, 1993
Aphis fabae Scopoli (Homoptera: Aphididae)	KR, US	L, W	N_c	Y	CIE, 1963; CPC, 1999
Aphis gossypii Glover (Homoptera: Aphididae)	KR, US	L, S, W	N_c	Y	APPPC, 1987; CPC, 1999; Hill, 1987
Aphis spiraecola Patch (Homoptera: Aphididae)	KR, US	F, W	N_c	Y	Cho, *et al.*, 1997; CPC, 1999
Aphrophora intermedia Uhler (Homoptera: Cercopidae)	KR	L	Y	N	Clausen, 1931; Hong, 1995; Shiraki, 1952
Arboridia apicalis (Nawa) (Homoptera: Cicadellidae)	KR	L	Y	N	Hong, 1995

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Pest	Geographic Distribution[0]	Plant Part Affected	Quaran-tine Pest	Likely to Follow Pathway	References
Arcte coerula Guenee (Lepidoptera: Noctuidae)	KR	F_a, L	Y_b	N_1	Hattori, 1969; Hong, 1995; Poole, 1989; Yoon and Lee, 1974; Zhang, 1994
Artena dotata (F.) (Lepidoptera: Noctuidae)	KR	F_a	Y_b	N_1	Danziger, 1982; Hattori, 1969; Poole, 1989; Yoon and Lee, 1974; Zhang, 1994
Ascomeryx naga (Moore) (Lepidoptera: Sphingidae)	KR	L	Y	N	Hong, 1995
Aspidobyctiscus lacunipennis (Jekel) (Coleoptera: Attelabidae)	KR	L	Y	N	Clausen, 1931; Hong, 1995; Shiraki, 1952
Asteropetes noctuina (Butler) (Lepidoptera: Noctuidae)	KR	L	Y	N	Hong, 1995; Poole, 1989
Bambalina spp. (Lepidoptera: Psychidae)	KR	L, S	Y	N	Anon, 1986
Basilepta fulvipes (Mutschulsky) (Coleoptera: Chrysomelidae)	KR	L	Y	N	Hong, 1995
Batracomorphus mundus (Uhler) (Homoptera: Cicadellidae)	KR	L	Y	N	Hong, 1995; Metcalf, 1968
Bothrogonia japonica Ishihara (Homoptera: Cicadellidae)	KR	L	Y_b	N	Hong, 1995; Kwon, 1968; Lee and Kwon, 1982; Shiraki, 1952
Brachyclytus singularis Kraatz (Coleoptera: Cerambycidae)	KR	S	Y	N	Hong, 1995
Bromius obscurus (L.) (Coleoptera: Chrysomelidae)	US KR	L	N	N	Anon, 1986; Hong, 1995; Metcalf and Metcalf, 1993
Bryobia praetiosa Koch (Acarina: Tetranychidae)	US KR	L, S	N_c	N	Hong, 1995; Jeppson, *et al.*, 1975
Callygris compositata (Guenee) (Lepidoptera: Geometridae)	KR	L	Y	N	Hong, 1995

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Pest	Geographic Distribution[0]	Plant Part Affected	Quaran-tine Pest	Likely to Follow Pathway	References
Calyptra lata (Butler) (Lepidoptera: Noctuidae)	KR	F_a, L	Y	N_1	Danziger, 1983; Hong, 1995; Lee, *et al.*, 1970; Zhang, 1994
Calyptra thalictri (Borkhausen) (Lepidoptera: Noctuidae)	KR	F_a, L	Y	N_1	Danziger, 1983; Hong, 1995; Lee, *et al.*, 1970; Poole, 1989
Catocala duplicata Butler (Lepidoptera: Noctuidae)	KR	L	Y	N	Hong, 1995; Poole, 1989
Catocala fulminea Scopoli (Lepidoptera: Noctuidae)	KR	L	Y	N	Hong, 1995; Poole, 1989
Catocala praegnax Walker (Lepidoptera: Noctuidae)	KR	L	Y	N	Anon, 1986; Poole, 1989
Cerambycidae, spp. of (Coleoptera: Cerambycidae)	KR	S	Y	N	PPQ Interceptions
Chlorophorus annularis (F.) (Coleoptera: Cerambycidae)	KR	S	Y_b	N	Duffy, 1968; Hong, 1995; Shiraki, 1952
Coccus hesperidum (L.) (Homoptera: Coccidae)	KR, US	F	N_c	Y	Gill, *et al.*, 1977; Hong, 1995
Conogethes punctiferalis (Guenee) (Lepidoptera: Pyralidae)	KR	F, L, S	Y_b	Y	CPC, 1999; Pierce, 1917; Yang, 1990
Craponius inaequalis Say (Coleoptera: Curculionidae)	KR, US	F	N	Y	Anon, 1986; Hill, 1997; Hong, 1995; O'Brien and Wibmer, 1982
Deilephila elpenor (L.) (Lepidoptera: Sphingidae)	KR	L	Y	N	Hong, 1995; Zhang, 1994
Deuterocopus albipunctatus Fletcher (Lepidoptera: Pterophoridae)	KR	L	Y	N	Hong, 1995; Shiraki, 1952
Drosophila melanogaster Meigen (Diptera: Drosophilidae)	KR, US	F	N_c	Y	CPC, 1999
Drosophila simulans Sturtevant (Diptera: Drosophilidae)	KR, US	F	N_c	Y	CPC, 1999
Drosophila suzukii Matsumura (Diptera: Drosophilidae)	KR, US (HI)	F	N_c	Y	CPC, 1999; Hong, 1995

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Pest	Geographic Distribution[0]	Plant Part Affected	Quarantine Pest	Likely to Follow Pathway	References
Dysgonia maturata (Walker) (Lepidoptera: Noctuidae)	KR	L	Y	N	Danziger, 1982; Hong, 1995; Poole, 1989; Yoon and Lee, 1974
Empoasca vitis (Gothe) (Homoptera: Cicadellidae)	KR	L	Y	N	Anon, 1986; Cerutti, *et al*., 1990; Hong, 1995; Kwon, 1983; Tevella and Arzone, 1989
Endoclyta excrescens (Butler) (Lepidoptera: Hepialidae)	KR	S	Y_b	N	Hong, 1995
Epiacanthus stramineus (Motschulsky) (Homoptera: Cicadellidae)	KR	L	Y	N	Hong, 1995; Metcalf, 1968; Syoziro, *et al*., 1965
Eudocima fullonia Clerck (Lepidoptera: Noctuidae)	KR, US (HI)	F_a	Y	N_1	Clausen, 1931; Danziger, 1982; Hong, 1995; Poole, 1989; Shiraki, 1952; Yoon and Lee, 1974
Eudocima tyrannus Guenee (Lepidoptera: Noctuidae)	KR	F_a	Y	N_1	Danziger, 1982; Hong, 1995; Kim and Lee, 1986; Poole, 1989; Shiraki, 1952; Zhang, 1994
Eulecanium kunoense (Kuwana) (Homoptera: Coccidae)	KR	S	Y_b	N_2	Hong, 1995
Eulithis ledereri (Bremer) (Lepidoptera: Geometridae)	KR	L	Y	N	Hong, 1995
Eupoecilia ambiguella Hubner (Lepidoptera: Tortricidae)	KR	F	Y_b	Y	Anon, 1994; CIE Map #76; EPPO, 1999; Helle, 1991; Pierce, 1917; Zhang, 1994
Euproctis piperita Oberthur (Lepidoptera: Lymantriidae)	KR	L	Y	N	Hong, 1995; Lee, *et al.*, 1992

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Euproctis similis (Fuessly) (Lepidoptera: Lymantriidae)	KR	L, S	Y_b	N	Anon, 1986; Carter, 1984; Ferguson, *et al*., 1978; Hodges, 1983; Shiraki, 1952
Everes argiades (Pallas) (Lepidoptera: Lycaenidae)	KR	L	Y	N	Hong, 1995
Frankliniella occidentalis Pergande (Thysanoptera: Thripidae)	KR, US	F, L	N_c	N	CPC, 1999; EPPO, 1999; Lewis, 1997; Nakahara, 1997
Glycyphana fulvistemma Motschulsky (Coleoptera: Scarabaeidae)	KR, US	L	N	N	Hong, 1995; Shiraki, 1952
Graptopsaltria nigrofuscata (Motschulsky) (Homoptera: Cicadidae)	KR	R, S	Y	N	Hong, 1995; Metcalf, 1968
Gryllotalpa africana Palisot de Beauvois (Orthoptera: Gryllotalpidae)	KR	R, S	Y	N	Anon, 1986; CIE Map. No. 293; Clausen, 1931; PNKTO
Heliothrips haemorrhoidalis Bouche (Homoptera: Thripidae)	KR, US	L	N_c	N	Bailey, 1957; Hong, 1995
Hemiberlesia lataniae (Signoret) (Homoptera: Diaspididae)	KR, US	S	N_c	N	Hong, 1995; Nakahara, 1982
Herpetogramma luctuosalis (Guenee) (Lepidoptera: Pyralidae)	KR	L	Y	N	Hong, 1995; Shiraki, 1952
Hippotion celerio L. (Lepidoptera: Sphingidae)	KR	L	Y	N	CPC, 1999; Flaherty, *et al*., 1992; Zhang, 1994
Holochlora japonica Brunner von Watternwyl (Orthoptera: Tettigoniidae)	KR	L	Y_b	N	Hong, 1995; Syoziro, *et al*., 1965
Hyphantria cunea (Drury) (Lepidoptera: Arctiidae)	KR, US	L	N_c	N	Hong, 1995; Metcalf and Metcalf, 1993; Zhang, 1994
Hypothenemus eruditus Westwood (Coleoptera: Scolytidae)	KR, US	S	N	N	Hong, 1995; Wood, 1982
Icerya purchasi (Maskell) (Homoptera: Margarodidae)	KR, US	L	N_c	N	Gill, 1993; Hong, 1995

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Illiberis tenuis (Butler) (Lepidoptera: Zygaenidae)	KR	L	Y	N	Hong, 1995
Kolla atramentaria (Motschulsky) (Homoptera: Cicadellidae)	KR	L	Y	N	Hong, 1995; Kwon, 1983
Lagoptera juno (Dalman) (Lepidoptera: Noctuidae)	KR	F_a	Y_b	N_1	Anon, 1986; Danziger, 1982; Kim and Lee,1986; Poole, 1989; Zhang, 1994
Ledra auditura Walker (Homoptera: Cicadellidae)	KR	L	Y	N	Hong, 1995; Metcalf, 1968; Syoziro, *et al*., 1965
Lepidosaphes tubulorum Ferris (Homoptera: Diaspididae)	KR	S	Y_b	N_2	Clausen, 1931; Hong, 1995; Shiraki, 1952
Lygocoris lucorum Meyer (Homoptera: Miridae)	KR	L	Y	N	Hong, 1995
Machaerotypus sibricus (Lethierry) (Homoptera: Membracidae)	KR	L	Y	N	Hong, 1995; Metcalf and Wade, 1965
Macrosiphum euphorbiae (Thomas) (Homoptera: Aphididae)	KR, US	L, S	N_c	N	CIE Map No. 44; CPC, 1999; Hill, 1987
Mamestra brassicae (L.) (Lepidoptera: Noctuidae)	KR	F, L, W	Y_b	N	CPC, 1999; EPPO, 1999; Zhang, 1994
Melanotus erythropygus Candeze (Coleoptera: Elateridae)	KR	R	Y	N	Hong, 1995
Metopta rectifasciata (Menetries) (Lepidoptera: Noctuidae)	KR	F_a	Y	N_1	Anon, 1986; Poole, 1989; Yoon and Lee, 1974; Zhang, 1994
Mimela fusania Bates (Coleoptera: Scarabaeidae)	KR	L	Y	N	Hong, 1995
Miridiba coreana Mijima & Kinoshita (Coleoptera: Scarabaeidae)	KR	L	Y	N	Anon, 1986; Brodell, 1999
Mythimna turca (L.) (Lepidoptera: Noctuidae)	KR	F_a, L	Y_b	N_1	Danziger, 1982; Hong, 1995; Poole, 1989; Yoon and Lee, 1974; Zhang, 1994

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Nippoptilia vitis (Sasaki) (Lepidoptera: Pterophoridae)	KR	F, L, S	Y	Y	Clausen, 1931; Hong, 1995; Shiraki, 1952; Takahashi, 1915
Oecanthus longicauda Matsumura (Orthoptera: Gryllidae)	KR	W	Y	N	Anon, 1986
Ophiusa tirhaca (Cramer) (Lepidoptera: Noctuidae)	KR	F_a	Y	N_1	Anon, 1986; Danziger, 1982; Poole, 1989; Yoon and Lee, 1974; Zhang, 1994
Oraesia emarginata F. (Lepidoptera: Noctuidae)	KR	F_a, L	Y	N_1	Danziger, 1982; Hong, 1995: Kim and Lee, 1986; Poole, 1989; Zhang, 1994
Oraesia excavata Butler (Lepidoptera: Noctuidae)	KR	F_a, L	Y	N_1	Hong, 1995; Kim and Lee, 1986; Poole, 1989; Zhang, 1994
Orthobelus flavipes Uhler (Homoptera: Membracidae)	KR	L, S	Y	N	Hong, 1995; Metcalf and Wade, 1965
Panonychus citri McGregor (Acarina: Tetranychidae)	KR, US	F, L	N_c	Y	CPC, 1999; Baker and Tuttle, 1994; Jeppson, *et al.*, 1975; Lee, *et al.*, 1992
Panonychus ulmi Koch (Acarina: Tetranychidae)	KR, US	L	N_c	N	CPC, 1999; Hong, 1995; Jeppson, *et al.*, 1975
Paranthrene regalis (Butler) (Lepidoptera: Sesiidae)	KR	S	Y	N	Clausen, 1931; Hong, 1995; Shiraki, 1952
Parlatoria theae Cockerell (Homoptera: Diaspididae)	KR, US	S	N_c	N_2	Hong, 1995; Nakahara, 1982
*Paropsides duodecimpustulat*a (Gebler) (Coleoptera: Chrysomelidae)	KR	L	N	N	Hong, 1995
Parthenolecanium corni Bouche (Homoptera: Coccidae)	KR, US	L, S	N_c	N_2	Ben-Dov, 1993; CPC, 1999

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Parthenolecanium persicae (F.) (Homoptera: Coccidae)	KR, US	L, S	N_c	N_2	Gill, 1988; Hill, 1997; Hong, 1995
Phyllopertha diversa Waterhouse (Coleoptera: Scarabaeidae)	KR	L	Y	N	Hong, 1995; Kawasaki and Tamaki, 1985
Phymatodes albicinctus Bates (Coleoptera: Cerambycidae)	KR	S	Y	N	Anon, 1986
Phymatodes maaki (Kraatz) (Coleoptera: Cerambycidae)	KR	S	Y	N	Duffy, 1968; Hong, 1995
Phytonemus pallidus (Banks) (Acarina: Tarsonemidae)	KR, US	L, W	N	Y	Banks, 1912; Cho, *et al*., 1993; CPC, 1999
Pinnaspis strachani (Cooley) (Homoptera: Diaspididae)	KR, US	F, W	N_c	Y	CPC, 1999; Nakahara, 1982; Paik,1972
Planococcus citri (Risso) (Homoptera: Pseudococcidae)	KR, US	W	N_c	Y	Bivins and Deal, 1973; CPC, 1999; Hill, 1997; Paik, 1972
Plautia stali Scott (Hemiptera: Pentatomidae)	KR, US (HI)	F, L, S	Y_b	N_3	Hong, 1995; Moriya and Shiga, 1984; Schaefer & Panizzi, 2000
Polistes snelleni De Saussure (Hymenoptera: Vespidae)	KR	F_a	N_c	N	Hong, 1995; Hill, 1997
Polygonia c-auerum L. (Lepidoptera: Nymphalidae)	KR	L	Y	N	Hong, 1995
Popillia japonica Newman (Coleoptera: Scarabaeidae)	KR, US	L	Y_b	N	Anon, 1986; CFR301.48
Pseudaulacaspis pentagona (Targioni-Tozzetti) (Homoptera: Diaspididae)	KR, US	S	N_c	N	Hong, 1995; Nakahara, 1982
Pseudococcus comstocki (Kuwana) (Homoptera: Pseudococcidae)	KR, US	F, W	N_c	Y	Anon, 1986; Metcalf and Metcalf, 1993
Quadraspidiotus perniciosus (Comstock) (Homoptera: Diaspididae)	US, KR	S	N_c	N_2	Hong, 1995; Nakahara, 1982

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Rhagastis mongoliana (Butler) (Lepidoptera: Sphingidae)	KR	L	Y_b	N	Clausen, 1931; Hong, 1995; Zhang, 1994
Rhomborrhina japonica Hope (Coleoptera: Scarabaeidae)	KR	L	Y	N	Hong, 1995
Ricania japonica Melichar (Homoptera: Ricaniidae)	KR	L	Y	N	Avidzba and Bobokhidze, 1982; Clausen, 1931; Dzhashi, *et al*., 1982; Hong, 1995; Metcalf, 1968
Saissetia coffeae (Walker) (Homoptera: Coccidae)	KR, US	L, S	N_c	N_2	Ben-Dov, 1993; Hamon and Williams, 1984; Hill, 1997
Sarbanissa subflava (Moore) (Lepidoptera: Noctuidae)	KR	L	Y	N	Hong, 1995; Poole, 1989
Scirtothrips dorsalis Hood (Homoptera: Thripidae)	KR, US (HI)	W	Y_b	N	CIE, 1986; EPPO, 1997; Hill, 1997; Hong, 1995; Lewis, 1997
Serrodes campana (Guenee) (Lepidoptera: Noctuidae)	KR	F_a, L	Y	N_1	Danziger, 1982; Hong, 1995; Poole, 1989; Zhang, 1994
Sparganothis pilleriana (Denis & Schiffermuller) (Lepidoptera: Tortricidae)	KR	F, L, S	Y_b	Y	Anon, 1986; Carter, 1984; Helle, 1991; Zhang, 1994
Spilosoma imparilis (Butler) (Lepidoptera: Arctiidae)	KR	L	Y	N	Hong, 1995, Zhang, 1994
Spilosoma subcarnea Walker (Lepidoptera: Arctiidae)	KR	L	Y	N	Clausen, 1931; Hong, 1995; Shiraki, 1952
Spirama retorta (Clerck) (Lepidoptera: Noctuidae)	KR	F_a, L	Y_b	N_1	Banziger, 1982; Hong, 1995: Kim and Lee, 1986; Poole, 1989; Yoon and Lee, 1974
Stathmopoda auriferella (Walker) (Lepidoptera: Oecophoridae)	KR	F	Y	Y	Cho, 1994; Hong, 1995; Shiraki, 1952

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Tetranychus hydrangeae Pritchard & Baker (= *T. kanzawai* Kishida) (Acarina: Tetranychidae)	KR	F, L, S	N	Y	CPC, 1999; Hong, 1995; Jeppson, *et al.*,1975; Kim, *et al.*, 1993; Kondo, *et al.*, 1987; Navajas, *et al.*, 2001
Tetranychus urticae Koch (Acarina: Tetranychidae)	KR, US	L	N_c	N	Baker and Tuttle, 1994; CPC, 1999
Theretra clotho (Drury) (Lepidoptera: Sphingidae)	KR	L	Y	N	CPC, 1999; Kim, *et al.*, 1982
Theretra japonica Orza (Lepidoptera: Sphingidae)	KR?	L	Y_b	N	Hong, 1995; Pittaway, 1996
Theretra oldenlandiae (F.) (Lepidoptera: Sphingidae)	KR	F_a, L	Y	N_1	Hong, 1995; Kim, *et al.*, 1993; Park, *et al.*, 1988; Zhang, 1994
Thinopteryx crocoptera (Koller) (Lepidoptera: Geometridae)	KR	L	Y	N	Hong, 1995
Thrips hawaiiensis (Morgan) (Homoptera: Thripidae)	KR, US	F, L	N_c	Y	CIE, 1983; CPC, 1999; Nakahara, 1994
Thrips tabaci Lindemann (Homoptera: Thripidae)	KR, US	L	N_c	N	APPPC, 1987; CIE, 1969; CPC,1999
Vespa mandarina Smith (Hymenoptera: Vespidae)	KR	F_a	N_c	N	Hill, 1997; Hong, 1995
Vespa xanthoptera Cameron (Hymenoptera: Vespidae)	KR	F_a	N_c	N	Hill, 1997; Hong, 1995
Viteus vitifoliae (Fitch) Homoptera: Phylloxeridae)	KR, US	L, R	N	N	EPPO, 1999; Hong, 1995; Metcalf and Metcalf, 1993
Xestia c-nigrum L. (Lepidoptera: Noctuidae)	KR, US	L	N_c	N	CPC, 1999; Eguchi, 1926; Hill, 1997; Lafontaine, 1998
Xyleborus adembratus Blandford (Coleoptera: Scolytidae)	KR, US	S	N	N	Hong, 1995
Xyleborus saxesenii (Ratzeburg) (Coleoptera: Scolytidae)	KR, US	S	N_c	N	Hong, 1995; Wood, 1982

Table 2: Pests of *Vitis* spp. in Korea

Pest	Geographic Distribution[0]	Plant Part Affected	Quaran-tine Pest	Likely to Follow Pathway	References
Xylotrechus pyrrhoderus Bates (Coleoptera: Cerambycidae)	KR	S	Y_b	N	Ashihara, 1982; Clausen, 1931; Hong, 1995
Viruses					
Broad bean wilt fabavirus (Comoviridae)	KR, US	W	N	Y	Chang and Chung, 1987; CPC, 1999; Pearson and Goheen, 1988
Tomato ringspot nepovirus (Comoviridae)	KR, US	F, W	N	Y	CPC, 1999; Pearson and Goheen, 1988
Bacteria					
Agrobacterium tumefaciens (Smith & Townsend) Conn (Eubacteriales)	KR, US	F, R	N_c	Y	Bradbury, 1986; CPC, 1999
Pseudomonas syringae pv. *syringae* van Hall (Pseudomonadales)	KR, US	W	N_c	Y	Bradbury, 1986; CPC, 1999
Pseudomonas viridiflava (Burkholder) Dowson (Zymobacteria: Pseudomonadales)	KR, US	F, L, R	N	Y	Choi, 1989; CPC, 1999; Young and Fletcher, 1997
Fungi					
Acrospermum viticola Ikata (Ascomycetes: Dothideales)	KR	L	Y	N	Hong, 1995; KSPP, 1972
Alternaria alternata (Hyphomycetes)	KR, US	F, L	N_c	Y	CPC, 1999; Farr, *et al*., 1989
Botryosphaeria dothidea (Moug.) Ces. & De Not (Ascomycota: Dothideales)	KR, US	F, S	N_c	Y	CPC, 1999; Farr, *et al*., 1989
Botryotinia fuckeliana (de Bary) Whetzel (Anamorph: *Botrytis cinerea* Pers.:Fr.) (Ascomycetes: Helotiales)	KR, US	F, L, S	N_c	Y	Farr, *et al.,* 1989; Hong, 1995; MacFarlane 1968
Colletotrichum acutatum J.H.Simmonds (Coelomycetes)	KR, US	F	N_c	Y	CPC, 1999; EPPO, 1999
Coniella diplodiella (Speg.) Petr & Syd (Syn: *Coniothyrium diplodiella* (Speg.) Sacc.) (Coelomycetes)	KR, US	F	N_c	Y	CPC, 1999; EPPO, 1999; Farr, *et al*., 1989; Hong, 1995; KSPP, 1972

Table 2: Pests of *Vitis* spp. in Korea

Pest	Geographic Distribution[0]	Plant Part Affected	Quaran-tine Pest	Likely to Follow Pathway	References
Cryptosporella viticola Shear (Pyrenomycetes: Diaporthales)	KR, US	F	N_c	Y	Farr, *et al*., 1989; Hong, 1995
Elsinoe ampelina Shear (Anamorph: *Sphaceloma ampelinum* deBary) (Ascomycetes: Dothideales)	KR, US	F, L	N_c	Y	Farr, *et al*., 1989; Hong, 1995; KSPP, 1972
Glomerella cingulata (Stoneman) Spauld.& Schrenk (Pyrenomycetes: Phyllachorales)	KR, US	F, L	N_c	Y	Farr, *et al*., 1989; Hong, 1995
Macrophomina phaseolina (Tassi) Goidanich (Coelomycetes)	KR, US	R	N_c	N	Boewe, 1963; Farr, *et al*., 1989; Raabe, *et al*., 1981
Monilinia fructigena Honey in Whetzel (Syn = *Monilia fructigena* Pers.) (Ascomycetes: Leotiales)	KR	F	Y_b	Y	CPC, 1999; EPPO, 1999; Farr, *et al*., 1989; Guidiciepietro, 2000.
Monochaetia spp. (Coelomycetes)	KR	L	N_c	N	Hong, 1995; KSPP, 1972
Nectria haematococca var. brevicona (Wollenw.) Gerlach (Anamorph: *Fusarium solani* (Martius) Sacc.) (Ascomycetes: Hypocreales)	KR, US	R	N_c	N	CPC, 1999; Farr, *et al*., 1989
Nectria radicicola Gerlach & L. Nilsson (Aanamorph: *Cylindrocarpon destructans* (Zinssmeister) Scholten) (Ascomycetes: Hypocreales)	KR, US (CA)	R	N_c	N	CPC, 1999; Farr, *et al*., 1989
Pestalotiopsis uvicola (Speg.) Bissett(Syn: *Pestalotia uvicola* Speg.) (Coelomycetes)	KR, US	F	N	Y	Farr, *et al*., 1989; Hong, 1995; KSPP, 1972
Phaeoisariopsis vitis (Lev.) Saw. (Hyphomycetes)	KR	L	Y	N	Park, 1958

Table 2: Pests of *Vitis* spp. in Korea

Pest	Geographic Distribution[0]	Plant Part Affected	Quaran-tine Pest	Likely to Follow Pathway	References
Phyllosticta ampelecida (Engelm.) van der Aa (syn. *P. viticola* Sacc et Speg.) (Teleomorph: *Guignardia bidwellii* (Ell.) Vialle et Ravaz) (Coelomycetes)	KR, US	F, L, S	N	Y	Farr *et al.*, 1985; Park, 1958; Pearson and Goheen, 1988
Physalospora baccae Cavara (Ascomycetes: Amphishaeriales)	KR	F, L, S	Y	Y	Hong, 1995; KSPP, 1972; Shin *et al.*, 1984; Tanaka, *et al.*,1976
Physopella ampelopsidis (Diet. & P. Syd) Cummins & Ramachar (Syn: *Phakopsora ampelopsidis* Dietel & Sydow) (Teliomycetes: Uredinales)	KR, US	F, L, S	N_c	Y	Anon., 1986; EPPO, 1999; Farr, *et al*., 1989; Hong, 1995
Phytophthora cryptogea Pethybridge & Lafferty (Oomycetes: Pythiales)	KR, US	L, R, S	N	N	CPC, 1999; Farr, *et al*., 1989; Jee et al., 1996
Plasmopara viticola (Berk.& M.A Curtis) Berl.& De Toni (Oomycetes: Peronosporales)	KR, US	F, L, S	N_c	Y	CPC, 1999; Farr, *et al*., 1989; Hong, 1995; KSPP, 1972
Pseudocercospora vitis (Lév.) Spegazzini (Syn: *Cercospora viticola* (Ces.) Sacc.) (Hyphomycetes)	KR, US	L	N_c	N	Anon., 1986; Farr, *et al*., 1989; Hong, 1995
Rhizopus stolonifer (Ehrenb.:Fr.) Vuill (Zygomycetes)	KR, US	F	N_c	Y	CPC, 1999; Farr, *et al*., 1989
Rosellinia necatrix Prill. (Ascomycetes: Xylariales)	KR, US	R	N	N	CPC, 1999; Farr, *et al*., 1989
Septoria badhami Berk. & Br. (Coelomycetes)	KR	L	Y	N	Grove, 1935; Hong, 1995; KSPP, 1972
Uncinula necator (Schwein.) Burrill (Anamorph: *Oidium tuckeri* Berk.) (Ascomycetes: Erysiphales)	KR, US	F, L, S	N_c	Y	Anon., 1986; Farr, *et al*., 1989; Hong, 1995; KSPP, 1972

Table 2: Pests of *Vitis* spp. in Korea

Pest	Geographic Distribution[0]	Plant Part Affected	Quaran-tine Pest	Likely to Follow Pathway	References
Verticillium dahliae Kleb. (Hyphomycetes)	KR, US	L, S, W	N_c	Y	CPC, 1999; EPPO, 1999; Farr, *et al*., 1989: Park, *et al*., 1995
Nematodes					
Criconemella spp. (Cricomenatidae)	KR, US	R	N	N	CPC, 1999
Helicotylenchus pseudorobustus (Steiner) Golden (Tylenchida: Hoplolaimidae)	KR, US	R	N_c	N	Choi, 1975; CPC, 1999
Hemicriconemoides mangiferae Siddiqi (Tylenchida: Criconematidae)	KR, US (CA, FL)	R	Y_b	N	Choi and Jeong, 1995; CPC, 1999
Meloidogyne arenaria (Neal) Chitwood (Tylenchida: Meloidogynidae)	KR, US	R	N_c	N	Choi, 1981; CPC, 1999; SON, 1984
Meloidogyne hapla Chitwood (Tylenchida: Meloidogynidae)	KR, US	R	N_c	N	Chitwood, 1949; Choi, 1981; CPC, 1999; Evans, *et al*., 1993; Tayler and Sasser, 1978
Paratrichodorus porosus (Allen) Siddiqi (Triplonchida: Trichodoridae)	KR, US	R	N_c	N	CPC, 1999; Decraemer, 1995; Evans, *et al*, 1993; Lee, 1976
Paratylenchus lepidus Raski (Paratylenchidae)	KR	R	Y	N	Pinochet and Raski, 1977
Pratylenchus penetrans (Cobb) Filipjev & Schuurmans Stekhoven (Tylenchida: Pratylenchidae)	KR, US	R	N_c	N	CPC, 1999; Evans, 1993; Jeong and Kim, 1989; Siddiqi, 1985
Trichodorus spp. (Triplonchida: Trichodoridae)	KR, US	L, R	N	N	CPC, 1999; Decraemer, 1995; Norton, *et al*., 1984
Tylenchulus semipenetrans Cobb (Tylenchida: Tylenchulidae)	KR, US	L, R	N	N	Choi, 1975; CPC, 1999; EPPO, 1999; Fielding and Hollis, 1956; SON, 1984

F = Fruit, L = Leaves, S = Stem, W = Whole plant; Y = Yes, N = No.

a – Fruit is attacked by pests in the adult stage only and not expected to follow the pathway.
b – Listed in the APHIS PPQ catalog of intercepted pests as 'Actionable' (USDA, 1999)
c – Listed in the APHIS PPQ catalog of non - reportable dictionary as 'Non-Actionable' (USDA, 1999)

[0] – Distribution: KR - Korea, US - United States

[1] – There is a group of fruit feeding arthropods, known as the 'fruit piercing moths', in which the adult stage (not the larval stage) attack the fruit of grape plants. Because these adult moths are associated directly with the fruit and fruit cluster, there is a chance that they may be present at harvest for various reasons, *i.e.*, temperature slowing their activity down while feeding. This does not seem to pose a likely threat though, as adults fly into orchards at night, feed for some time on fruit, and then depart (Banzinger, 1982). This group of moths for this risk assessment are therefore considered not likely to follow the pathway, and are notated with an "N_1" in the "Likely to Follow Pathway" column in the pest list.

[2] – There is a group of stem feeding arthropods in the scale families, Diaspidae and Coccidae. The concern is the presence of these scales on the portion of the stem that gets harvested with the grapes. Certainly the immature stage, called 'crawlers', may be present on the stem portion close to the grape clusters, searching for suitable locations to pierce the plant tissue with their stylets, but the preferred or final resting spot for these pests is mainly on the underside of leaves or on the stem tissue more closely related to the foliage (Kosztarab, 1996). These scale insects are therefore considered not likely to follow the pathway, and are notated with an "N_2" in the "Likely to Follow Pathway" column in the pest list.

[3] -- *Plautia stali* is a sap sucking insect that may be present as adults and/or nymphs on the grape plant. Feeding causes visible fruit blemishing (Schaefer & Panizzi, 2000) which makes it easier to observe an infestation during harvest. In addition, the insects are likely to fall off the grape clusters when disturbed during the harvest procedures, so are not expected to follow the pathway.

Any pest species listed in the above pest list that has a "Y" in the "Quarantine Pest" column, is considered to be a quarantine pest of grapes from Korea. Should any of these pests be intercepted on commercial (or any other) shipments of *Vitis* spp. fruit, quarantine action may be taken.

Only those quarantine pests that can reasonably be expected to follow the pathway, *i.e.*, be included in commercial shipments of *Vitis* spp. fruit, were analyzed in detail. Only quarantine pests that have a "Y" in the "Likely to Follow Pathway" column AND a "Y" in the "Quarantine Pest" column were selected for further analysis and subjected to steps 5-7 below (USDA, 2000).

Other plant pests in this Assessment, not chosen for further scrutiny, may be potentially detrimental to the agricultural production systems of the United States; however, there were a variety of reasons for not subjecting them to further analysis. For example, they are associated

mainly with plant parts other than the commodity; they may be associated with the commodity (however, it was not considered reasonable to expect these pests to remain with the commodity during processing), or they have been intercepted as biological contaminants of these commodities during inspection by Plant Protection and Quarantine Officers but would not be expected to be present with every shipment. In addition, the biological hazard of organisms identified only to the generic level is not assessed due to the lack of adequate biological/taxonomic information. This lack of biological information on any given insect or pathogen should not be equated with low risk. By necessity, pest risk assessments focus on those organisms for which biological information is available. By developing detailed assessments for known pests that inhabit a variety of niches on the parent species, *i.e.,*on the surface of or within the bark/wood, on the foliage, *etc*., effective mitigation measures can be developed to eliminate the known organism and any similar unknown ones that inhabit the same niches.

5. Consequences of Introduction

The consequences of introduction (Table 3) were considered for each quarantine likely to follow the pathway. Each pest is rated on five biological features (Risk Elements, REs) (USDA, 2000) The cumulative score for Risk Elements is considered to be a biological indicator of the potential destructiveness of the pest.

Table 3: Risk Rating for Consequences of Introduction: (Risk Elements #1-5)

Pest	Climate/ Host Interaction	Host Range	Dispersal Potential	Economic Impact	Environ-mental Impact	Risk Rating
Conogethes punctiferalis (Lepidoptera: Pyralidae)	High	High	High	Medium	Medium	High
Eupoecilia ambiguella (Lepidoptera: Tortricidae)	High	Medium	High	High	Medium	High
Nippoptilia vitis (Lepidoptera: Pterophoridae)	Medium	Low	Medium	Medium	Low	Medium
Sparganothis pilleriana (Lepidoptera: Tortricidae)	Medium	High	Medium	Medium	High	High
Stathmopoda auriferella (Lepidoptera: Oecophoridae)	High	High	Medium	Low	Low	Medium
Monilinia fructigena (Ascomycetes: Leotiales)	High	High	High	Low	Medium	High
Physalospora baccae (Ascomycetes:Amphishaeriales)	High	Low	Medium	Medium	Medium	Medium

6. Introduction Potential

Each pest is rated with respect to likelihood of introduction based on two separate components. First, an estimate is made concerning the amount of commodity likely to be imported (RE 6). Second, pest opportunity (RE 7) is estimated using five biological features. Details of the two RE's and the rating criteria are provided in (USDA, 2000). These ratings and the cumulative (Total) score for Risk Elements 6 and 7, *i.e.*, the "Likelihood of Introduction Risk Rating" are shown in Table 4.

Table 4: Risk Rating for Likelihood of Introduction: (Risk Elements #6 and #7)

Pest	Quantity imported annually	Likelihood of surviving postharvest treatment	Likelihood of surviving shipment	Likelihood of not being detected at port of entry	Likelihood of moving to suitable habitat	Likelihood of finding suitable hosts	Risk Rating
Conogethes punctiferalis	Low	High	High	Medium	High	High	High
Eupoecilia ambiguella	Low	High	High	Medium	High	Medium	High
Nippoptilia vitis	Low	High	High	Medium	Medium	Low	Medium
Sparganothis pilleriana	Low	High	High	Medium	Medium	High	High
Stathmopoda auriferella	Low	High	Medium	Medium	High	High	High
Monilinia fructigena	Low	High	Medium	Medium	Medium	High	Medium
Physalospora baccae	Low	Medium	Medium	Medium	High	Low	Medium

7. Conclusion: Pest Risk Potential and Phytosanitary Measures

The measure of pest risk potential combines the risk ratings for consequences and likelihood of introduction (USDA, 2000). The estimated pest risk potential for each quarantine pest selected for further analysis for the importation of *Vitis* spp. fruit is provided in Table 5.

Table 5: Pest Risk Potential	
Conogethes punctiferalis (Guenee) (Lepidoptera: Pyralidae)	High
Eupoecilia ambiguella Hubner (Lepidoptera: Tortricidae)	High
Nippoptilia vitis (Sasaki) (Lepidoptera: Pterophoridae)	Medium
Sparganothis pilleriana (Denis & Schiffermuller) (Lepidoptera: Tortricidae)	High
Stathmopoda auriferella (Walker) (Lepidoptera: Oecophoridae)	High
Monilinia fructigena Honey in Whetzel (Ascomycetes: Leotiales)	High
Physalospora baccae Cavara (Ascomycetes: Amphishaeriales)	Medium

Plant pests with a high Pest Risk Potential may require specific phytosanitary measures. The choice of appropriate sanitary and phytosanitary measures to mitigate risks is undertaken as part of Risk Management and is not addressed, *per se*, in this document.

This Risk Assessment was updated in March 2002 to reflect changes in synonomy, (specifically for *Tetranychus hydrangeae*, formally *T. kanzawai*), re-organization of the footnotes in Table 2 and footnote text following Table 2, and the addition of references cited.

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