Pathway-Initiated Risk Assessment of Yard-Long-Bean (*Vigna unguiculata* (L.) Walp. subsp. *sesquipedalis* (L.) Verdc.) Imported as Fresh Immature Fruit Pods from Nicaragua into the Continental United States

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I. INTRODUCTION

This risk assessment was prepared by the Animal and Plant Health Inspection Service, (APHIS), Plant Protection and Quarantine (PPQ), U. S. Department of Agriculture (USDA) under Purchase Order Number 43-6395-0-2185 (dated June 27, 2000). The project was supported by the U. S. Agency for International Development under Project Hurricane Mitch Economic Initiative.

The purpose of the risk assessment is to examine pest risks associated with the importation into the continental United States of fresh, immature pods (fruits) of *Vigna unguiculata* (L.) Walp. subsp. *sesquipedalis* (L.) Verdc. [synonym *V. sesquipedalis* (L.) Fruw.] (yard-long-bean, long-bean, and asparagus-bean) (Fabaceae) from Nicaragua. *Vigna unguiculata* (L.) Walp., subsp. *unguiculata* (cowpea and black-eyed pea) [synonym *V. sinensis* (L.) Savi ex Hassk.] is included in the literature search because of its close taxonomic relationship, pest population similarities shared with yard-long-bean, cowpea is grown in Nicaragua (Litzenberger and Stevenson, 1957) and because there is little literature on pests of yard-long-bean. We also expanded the literature search for this commodity and cowpea to include the adjoining countries Honduras and Costa Rica because the absence of geographical, climatic, and quarantine barriers between them and Nicaragua suggests a shared pest population, and there is little pest literature specific just to Nicaraguan crops. We also included records from unspecified areas of Central America because they could include Nicaragua. We considered it reasonable to expect that quarantine pests from any of the above areas could occur on yard-long-bean in Nicaragua. This risk assessment is qualitative and risk is expressed using the terms high, medium, and low, rather than in quantitative terms (probabilities or frequencies). The methodology and rating criteria can be found in: *Pathway-Initiated Pest Risk Assessments: Guidelines for Qualitative Assessments, Version 5.0* (USDA, 2000).

Regional and international plant protection organizations (*e.g.*, North American Plant Protection Organization [NAPPO] and the International Plant Protection Convention [IPPC] administered by the Food and Agriculture Organization [FAO] of the United Nations) provide guidance for conducting risk analyses. The methods used to initiate, conduct, and report this assessment are consistent with guidelines provided by NAPPO and FAO. Our use of biological and phytosanitary terms conforms to the *Definitions and Abbreviations* (Introduction Section) in *International Standards for Phytosanitary Measures, Section 1-Import Regulations: Guidelines for Pest Risk Analysis* (FAO, 1996).

The FAO guidelines describe three stages of pest risk analysis: Stage 1 (initiation), Stage 2 (risk assessment), and Stage 3 (risk management). The present document satisfies the requirements of FAO Stages 1 and 2.

II. RISK ASSESSMENT

A. Initiating Event: Proposed Action

This risk assessment is commodity-based and therefore "pathway-initiated." It was conducted in response to a request for the USDA to authorize the importation of a particular commodity presenting a potential plant pest risk. The importation into the continental United States of fresh, immature pods of yard-long-bean is a potential pathway for the introduction of plant pests. The regulatory authority for the importation of fruits and vegetables from foreign sources into the United States is found in the *Code of Federal Regulations* (7CFR§319.56).

B. Assessment of Weediness Potential

The results of weediness screening of yard-long-bean from Nicaragua (Table 1) did not prompt a pest-initiated risk assessment. Weediness potential was not evaluated for cowpea because only yard-long-bean will be imported.

Table 1. Process for Determining Weediness Potential of the Commodity

Commodity: Immature pods of *Vigna unguiculata* (L.) Walp. subsp. s*esquipedalis* (L.)Verdc. (yard-long-bean, long-bean, asparagus-bean) (Fabaceae) for consumption.

Phase 1: Yard-long-beans are cultivated throughout the United States.

Phase 2: Is the subspecies listed in:

NO *Geographical Atlas of World Weeds* (Holm, *et al.*, 1979).
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 Act* (Gunn and Ritchie, 1982).
NO *Economically Important Foreign Weeds* (Reed, 1977).
NO *Composite List of Weeds* (Weed Science Society of America, 1989).
NO *World Weeds* (Holm, *et al.*, 1997).
NO Is there any literature reference indicating weediness (*e.g.*, *AGRICOLA*, *CAB*, *Biological Abstracts*, and *AGRIS* search on "subspecies name" combined with "weed").

Phase 3: Conclusion: The species has not been reported to be weedy. Seeds are available from garden centers and seed suppliers. The weediness potential of importing the commodity from Nicaragua is negligible.

C. Previous Risk Assessments, Decision History and Pest Interceptions

Previous risk assessments:
There are no previous risk assessments for the importation of yard-long-bean into the United States.

Decision history:
1995 - Nicaragua, Mung bean (*V. radiata* (L.) R. Wilczek var. *radiata*): Mung beans without pods (= shelled beans) are pemitted entry subject to inspection. Unshelled beans in pods are permited entry subject to methyl bromide treatment (T101-k-2) for *Maruca vitrata* Fabricius.

1995 - Honduras, Yard-long-bean: Beans without pods are pemitted entry subject to inspection. Unshelled beans in fruit pods are permitted entry with treatment, T101-k-2, for *Maruca vitrata* and *Epinotia aporema* (Walsingham).

Pest interceptions:
The PIN309 interception database (APHIS, 2000) is a searchable computer record of interceptions by APHIS inspectors maintained for internal use by USDA.

Interceptions from Nicaragua: Noctuidae species (Lepidoptera) intercepted at the airport in permit cargo. Because the species was identified to family Noctuidae and it could have been one of many possible species, the pest is listed in Table 2, but it is not rated for risk or consequences of introduction.

Pest interceptions from Costa Rica and Honduras on the pods/fruits of *Vigna* species.: For Costa Rica, there were no interception records. For Honduras, Phycitinae species (Lepidoptera), one interception recorded at airport in baggage. Because the species was unidentified and it could have been one of many possible species, the pest is listed in Table 2, but it is not rated for risk or consequences of introduction.

D. Pest Categorization

Pests reported in the scientific and regulatory literature on yard-long-bean and cowpea from Nicaragua, Costa Rica, Honduras, unspecified localities in Central America, and the United States are recorded in Table 2. Table 2 also presents information about geographic distribution, host association, and regulatory data. Table 2 served as a basis for selecting pests for more detailed biological analyses. Pests recorded specifically from yard-long-bean are identified with a "+" in the pest name column of Table 2.

Table 2. Pests associated with *Vigna unguiculata* subsp. *sesquipedalis* (yard-long-bean, long-bean, and asparagus-bean) and *Vigna unguiculata* subsp. *unguiculata* (cowpea and black-eyed pea) in Nicaragua, Costa Rica, Honduras, unspecified localities in Central America, and the United States.

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
ARTHROPODS					
Acanalonia excavata Van Duzee (Homoptera: Acanaloniidae)	NI	L, S	Y	N	Arnett, 1985; Maes and O'Brien, 1988; Maes and Robleto, 1988
Acanthoscelides obtectus (Say) (Coleoptera: Bruchidae)	NI, US	Sd	N	Y	CABI, 2000; Metcalf and Metcalf, 1993
Aceratagallia sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988 (listed as *Acertagallia* sp.)
Acromyrmex sp. (Hymentoptera: Formicidae)	NI	L	Y	N	King and Saunders, 1984; Maes and Robleto, 1988
Agallia sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988
Agrotis ipsilon (Hufnagel) (Lepidoptera: Noctuidae)	NI, US	L, S, W	N	Y	Caballero, *et al.,* 1994; CABI, 2000
Agrotis [= *Feltia*] *subterranea* (Fabricius) (Lepidoptera: Noctuidae)	NI, US	L, S, W	N	Y	Caballero, *et al.,* 1994; CABI, 2000; Maes and Robleto, 1988

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Aleurodicus dispersus Russell (Homoptera: Aleyrodidae)	CR, US (FL)	L	Y	N	CABI, 2000; Mound and Halsey, 1978
Anticarsia gemmatalis Hubner (Lepidoptera: Noctuidae)	NI, US	L, P/F, S, W	N	Y	CABI, 2000; Maes and Robleto, 1988
Anypotactus [=*Parasomus*] *jansoni* (Sharp) (Coleoptera: Curculionidae)	NI	L, R, S	Y	N	Blackwelder, 1947; Lingafelter, 2001; Maes and O'Brien, 1990
Aphis craccivora + Koch (Homoptera: Aphididae)	NI, US	L, S, W	N	Y	Blackman and Eastop, 1984; CABI, 2000; IIE, 1983; Morton, 1997
Aphis gossypii + Glover (Homoptera: Aphididae)	NI, US	Fw, L, S, W	N	Y	CABI, 2000; McGuire and Crandall, 1967; Morton, 1997; Passoa, 1983
Aphis spiraecola Patch (Homoptera: Aphididae)	NI, US	Fw, L, P/F, S	N	Y	CABI, 2000; McGuire and Crandall, 1967; Passoa, 1983
Aspidiotus destructor Signoret (Homoptera: Diaspididae)	NI, US	L, P/F, S	N	Y	CABI, 2000

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Atta mexicana (F. Smith) (Hymenoptera: Formicidae)	NI, US	L	N	N	Cazin, *et al.*, 1989; King and Saunders, 1984; Maes and Robleto, 1988; McGuire and Crandall, 1967
Balclutha hebe (Kirkaldy) (Homoptera: Cicadellidae)	NI, US	L	N	N	Maes and Robleto, 1988
Bemisia tabaci (Gennadius) (Homoptera: Aleyrodidae)	NI, US	L	N	N	King and Saunders, 1984; Maes and Mound, 1993; McGuire and Crandall, 1967; Passoa, 1983
Callosobruchus maculatus (Fabricius) (Coleoptera: Bruchidae)	NI, US	Sd	N	N	CABI, 2000; Metcalf and Metcalf, 1993; Passoa, 1983
Carneocephala sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988
Carpophilus sp. (Coleoptera: Nitidulidae)	NI, US	P	N	Y	CABI, 2000

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Cerotoma ruficornis Olivier[4] [= *C. ruficornis atrofasciata* (Jacoby); *C. ruficornis rogersi* Jacoby] (Coleoptera: Chrysomelidae)	NI, US (AZ)	Fw, L, R, S, W	N	N	King and Saunders, 1984; Konstantinov, 2000 personal communication); Lingafelter, 2001; Maes and Robleto, 1988; Maes and Ruppel, 1991; Maes and Staines, 1991; McGuire and Crandall, 1967; Passoa, 1983; Poole and Gentili, 1996a; Risch, 1976
Chlorotettix emarginatus Baker (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988; McGuire and Crandall, 1967; Passoa, 1983
Coccus longulus (Douglas) (Homoptera: Coccidae)	HN, US	L, P/F, S	N	Y	CABI, 2000; Scalenet, 2001
Colaspis hypochlora Lefevre (Coleoptera: Chrysomelidae)	NI	Fw, L, R	Y	N	Blackwelder, 1946; Hill, 1994; King and Saunders, 1984; Maes and Robleto, 1988; Passoa, 1983

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Colaspis splendida Jacoby (Coleoptera: Chrysomelidae)	NI	L, R	Y	N	Blackwelder, 1946; Maes and Robleto, 1988
Creontiades rubrinervis (Stal) (Hemiptera: Miridae)	NI, US	F, L	N	N	King and Saunders, 1984; Maes and Carvalho, 1989; Maes and Robleto, 1988; McGuire and Crandall, 1967; Passoa, 1983; Poole and Gentili, 1997
Cycloneda sanguinea Linnaeus (Coleoptera: Coccinellidae)	NI, US	L	N	N	Maes and Robleto, 1988
Cydia fabivora (Meyrick)[5] (Lepidoptera: Tortricidae)	CR	P/F	Y	N	CABI, 2001; Federal Register, 1996
Cyrpoptus suavis Stal (Homoptera: Fulgoridae)	NI	L, S	Y	N	Maes and O'Brien, 1988; Maes and Robleto, 1988; Passoa, 1983
Delphacodes fulvidorsum (Metcalf) (Homoptera: Delphacidae)	NI, US (TX)	L	Y	N	Maes and Robleto, 1988; Metcalf, 1943; Poole and Gentili, 1997
Deltocephalus sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Diabrotica adelpha Harold (Coleoptera: Chrysomelidae)	NI	Fw, L, R	Y	N	Blackwelder, 1946; King and Saunders, 1984; Maes and Staines, 1991; McGuire and Crandall, 1967; Passoa, 1983; Risch, 1976; Wilcox, 1975
Diabrotica balteata LeConte (Coleoptera: Chrysomelidae)	NI, US	Fw, L, P/F, R	N	N	Arnett, 1985; Blackwelder, 1946; CABI, 2000; King and Saunders, 1984; Maes and Robleto, 1988; Maes and Staines, 1991; McGuire and Crandall, 1967; Passoa, 1983; Poole and Gentili, 1996a; Risch, 1976
Diabrotica + *octoplagiata* Jacoby (Coleoptera: Chrysomelidae)	NI	Fw, L, R	Y	N	Blackwelder, 1946; King and Saunders, 1984; Maes and Staines, 1991; Morton, 1997; Passoa, 1983; Wilcox, 1975
Diaphania hyalinata (Linnaeus) (Lepidoptera: Pyralidae)	HN, US	Fw, L, P/F, S	N	Y	CABI, 2000

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Diaphania indica (Saunders)[6] (Lepidoptera: Pyralidae)	CR, HN, US (FL)	Fw, L, S, P/F	Y	Y	CABI, 2000; Janzen, 2001[6]; Kimball, 1965; Solis, 2001; Whittle and Ferguson, 1978
Disonycha fumata (Leconte) (Coleoptera: Chrysomelidae)	NI, US	L	N	N	Maes and Staines, 1991; Poole and Gentilli, 1996a
Draeculacephala clypeata Osborn (= *D. lenticula* Ball) (Homoptera: Cicadellidae)	NI	L	Y	N	Maes, 1992; Maes and Robleto, 1988; McGuire and Crandall, 1967; Passoa, 1983
Dysmicoccus + neobrevipes Beardsley[7] (Homoptera: Pseudococcidae)	CR, HN, US (HI)	L, P/F, S	Y	Y	APHIS, 1979; CABI, 2000; Scalenet, 2001
Elasmopalpus lignosellus (Zeller) (Lepidoptera: Pyralidae)	NI, US	L, P/F, R	N	Y	CABI, 2000; King and Saunders, 1984; Maes and Robleto, 1988; McGuire and Crandall, 1967
Empoasca sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988
Empoasca kraemeri (Ross and Moore) (Homoptera: Cicadellidae)	NI, US	L	Y	N	CABI, 2000; King and Saunders, 1984; McGuire and Crandall, 1967

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Epilachna tredecimnotata (Latreille)[8] (Coleoptera: Coccinellidae)	NI, US (AZ, TX)	Fw, L, F/P	N	Y	Arnett, 1985; Gordon, 1975; Maes, 1991; Maes and Robleto, 1988; Passoa, 1983; Poole and Gentili, 1996a
Epilachna varivestis Mulsant (Coleoptera: Coccinellidae)	NI, US	Fw, L, F/P	N	Y	CABI, 2000; Maes, 1991; Maes and Robleto, 1988; Passoa, 1983; Poole and Gentili, 1996a
Epinotia aporema (Walsingham) + (Lepidoptera: Tortricidae)	CR, US (TX)	Fw, L, P/F, S	Y	Y	APHIS, 2000; CABI, 2000; King and Saunders, 1984; Oakley, 1953; Poole and Gentili, 1996b; Schoonhoven, 1978; Zhang, 1994
Epitrix convexa Jacoby (Coleoptera: Chrysomelidae)	NI	L, R, S	Y	N	Blackwelder, 1946; Borror and DeLong, 1971; Maes and Staines, 1991
Estigmene acrea + Drury (Lepidoptera: Arctiidae)	NI, US	L, P/F	N	Y	CABI, 2000; Maes and Robleto, 1988; Morton, 1997; Schoonhoven, 1978

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Etiella zinckenella (Treitschke) (Lepidoptera: Pyralidae)	NI, US	L, Fw, P/F, S	N	Y	CABI, 2000; King and Saunders, 1984; Passoa, 1983
Exitianus sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988
Ferrisia virgata (Cockerell) Homoptera: Pseudococcidae)	NI, US	L, P/F, S	N	Y	Arnett, 1985; Ben-Dov, 1994; CABI, 2000; IIE, 1966; Scalenet, 2001
Fundella pellucens Zeller (Lepidoptera: Pyralidae)	HN, US	P/F, S	N	Y	Arnett, 1985; King and Saunders, 1984; Poole and Gentili, 1996b
Graminella sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988
Gypona sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988
Gyponana flavilineata Fitch (Homoptera: Cicadellidae)	NI, US	L	Y	N	Maes and Robleto, 1988; Poole and Gentili, 1997

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Halticus bracteatus (Say) (Hemiptera: Miridae)	NI, US	L	N	N	King and Saunders, 1984; Maes and Carvalho, 1989; Maes and Robleto, 1988; Metcalf and Metcalf, 1993; Passoa, 1983
Helicoverpa zea (Boddie) (Lepidoptera: Noctuidae)	NI, US	Fw, L, P/F	N	Y	CABI, 2000
Hortensia similis (Walker) (Homoptera: Cicadellidae)	NI, US	L	N	N	King and Saunders, 1984; Maes and Robleto, 1988; Poole and Gentili, 1997
Lema obscura Fabricius (Coleoptera: Chrysomelidae)	NI	L	Y	N	Blackwelder, 1946; Maes and Staines, 1991
Liriomyza sativae Blanchard (Diptera: Agromyzidae)	NI, US	L	N	N	CABI, 2000; King and Saunders, 1984; Maes and Robleto, 1988
Liriomyza trifolii Burgess (Diptera: Agromyzidae)	NI, US	L	N	N	CABI, 2000; Maes and Robleto, 1988

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Maruca vitrata + Fabricius[9] (Lepidoptera: Pyralidae)	NI, US (HI)	Fw, L, P/F	Y	Y	APHIS, 2000; CABI, 2000; IIE, 1996; Julius, *et al.,* 1992; Ke, *et al.*, 1985; King and Saunders, 1984; Maes and Robleto, 1988; Oakley, 1953; Passoa, 1983; Solis, 2000; Zhang, 1994
Metachroma inconstans Blake (Coleoptera: Chrysomelidae)	NI	L, R, S	Y	N	Maes and Robleto, 1988; Maes and Staines, 1991
Myzus persicae (Sulzer) (Homoptera: Aphididae)	NI, US	Fw, L, S, W	N	Y	CABI, 2000; Maes and Robleto, 1988
Nezara viridula (Linnaeus) (Hemiptera: Pentatomidae)	NI, US	Fw, L, P/F, S	N	Y	CABI, 2000; King and Saunders, 1984; Maes, 1994; Maes and Robleto, 1988; Passoa, 1983
Nodonota lefevrei (Jacoby) (Coleoptera: Chrysomelidae)	NI	Fw, L, S, R	Y	N	Blackwelder, 1946; King and Saunders, 1984; Maes and Staines, 1991; Poole and Gentili, 1996a

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Octotoma scabripennis Guerin (Coleoptera: Chrysomelidae)	NI, US (HI)	L	Y	N	Blackwelder, 1946; CABI, 2000; Maes and Staines, 1991; Staines, 1989
Olliarianus sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988
Oncometopia clarior (Walker) (Homoptera: Cicadellidae)	CR, HN, NI	L	Y	N	King and Saunders, 1984; Maes and Robleto, 1988
Pantomorus femoratus Sharp (Coleoptera: Curculionidae)	CR, HN, NI	Fw, L, R	Y	N	Blackwelder, 1947; King and Saunders, 1984; Maes and O'Brien, 1990; Maes and Robleto, 1988
Phycitinae sp. (Lepidoptera: Pyralidae)	HN	P/F	N	Y	APHIS, 2000
Platynota rostrana (Walker) (Lepidoptera: Tortricidae)	NI, US	L, P/F	N	Y	King and Saunders, 1984; Maes and Robleto, 1988; Poole and Gentili, 1996b; Zhang, 1994
Sanctanus fasciatus (Osborn) (Homoptera: Cicadellidae)	NI, US	L	N	N	Maes and Robleto, 1988; Poole and Gentili, 1997

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Saissetia neglecta De Lotto (Homoptera: Coccidae)	CR, HN, US	L, P/F, S	N	Y	Scalenet, 2001
Scaphytopius sp. (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988
Sibovia occatoria (Say) (Homoptera: Cicadellidae)	NI	L	Y	N	King and Saunders, 1984; Maes and Robleto, 1988; McGuire and Crandall, 1967; Passoa, 1983; Poole and Gentili, 1997
Sitophilus oryzae (Linnaeus) (Coleoptera: Curculionidae)	NI, US	Sd	N	N	CABI, 2000; McGuire and Crandall, 1967; Maes and O'Brien, 1990; Passoa, 1983; Poole and Gentili, 1996a
Sitophilus zeamais Motschulsky (Coleoptera: Curculionidae	NI, US	Sd	N	N	CABI, 2000; Maes and O'Brien, 1990; Passoa, 1983; Poole and Gentili, 1996a
Spodoptera eridania (Cramer) (Lepidoptera: Noctuidae)	NI, US	L, P/F	N	Y	Caballero, *et al.*, 1994; CABI, 2000; King and Saunders, 1984

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Spodoptera exigua + (Hubner) (Lepidoptera: Noctuidae)	NI, US	L, P/F, W	N	Y	Caballero, *et al.*, 1994; CABI, 2000; Maes and Robleto, 1988; Morton, 1997
Spodoptera frugiperda (L. E. Smith) (Lepidoptera: Noctuidae)	NI, US	L, Fw, P/F, S, W	N	Y	Caballero, *et al.*, 1994; CABI, 2000; Maes and Robleto, 1988
Stenygra histrio Serville (Coleoptera: Cerambycidae)	NI	S	Y	N	King and Saunders, 1984; Maes, *et al.*, 1994; Maes and Robleto, 1988; McGuire and Crandall, 1967
Stirellus bicolor (Homoptera: Cicadellidae)	NI	L	Y	N	Maes and Robleto, 1988; Poole and Gentili, 1996
Systena s-littera (Linnaeus) (Coleoptera: Chrysomelidae)	NI, US (PR)	Fw, L, R, S	Y	N	CABI, 2000; King and Saunders, 1984; Maes and Staines, 1991; McGuire and Crandall, 1967
Tetranychus cinnabarinus (Boisduval) (Acari: Tetranychidae)	NI, US	L	N	N	CABI, 2000; Hill, 1994; King and Saunders, 1984; Maes and Robleto, 1988

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Tetranychus desertorum Banks (Acari: Tetranychidae)	NI, US	L	N	N	CABI, 2000; McGuire and Crandall, 1967; Schuster and Cherry, 1975
Tetranychus ludeni Zacker (Acari: Tetranychidae)	NI, US	L	N	N	Hill, 1994; King and Saunders, 1984; Maes and Robleto, 1988;
Tetranychus marianae McGregor (Acari: Tetranychidae)	NI, US	L	N	N	CABI, 2000; Hill, 1994; IIE, 1979; Ochoa, *et al.*, 1944
Tetranychus urticae Koch (Acari: Tetranychidae)	4C, US	L	N	N	CABI, 2000; Hill, 1994; King and Saunders, 1984; Ochoa, *et al.*, 1994
Trichoplusia ni (Hubner) (Lepidoptera: Noctuidae)	NI, US	L, P/F, S, W	N	Y	CABI, 2000; Maes and Robleto, 1988
Trigona sp. (Hymenoptera: Apidae)	NI	Fw, L	N	N	King and Saunders, 1984; Maes and Robleto, 1988
Urbanus dorantes dorantes (Stoll) (Lepidoptera: Hesperiidae)	NI, US	L	N	N	King and Saunders, 1984; Maes and Robleto, 1988; Poole and Gentili, 1996b; Zhang, 1994

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Zabrotes subfasciatus (Boheman) (Coleoptera: Bruchidae)	NI, US	Sd	N	N	CABI, 2000; King and Saunders, 1984
BACTERIA					
Pseudomonas savastanoi pv. *phaseolicola* (Burkholder) Gardan, *et al.* *[=Pseudomonas phaseolicola* (Burkholder) Dowson, *Pseudomonas syringae* pv. *phaseolicola* (Burkholder) Young et al.] (Pseudomonadales: Pseudomondaceae) +	CR, US	L, P/F, S Se	N	Y	ARS, 1960; CABI, 2000; CMI, 1973; Costa Rica, 1989; Hall 1991
Pseudomonas syringae pv. *syringae* (Burkholder) Garman, *et al.* (Pseudomonadales: Pseudomondaceae) +	HN, US	L, P/F, S	N	Y	ARS, 1960; CMI, 1979c; CABI, 2001; Hall, 1991; Wellman, 1977

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Xanthomonas axonopodis pv. *glycines* (Nakano) Vauterin, *et al.* [= *X. campestris* pv. *glycines* (Nakano) Dye] (Xanthomonadales: Xanthomonadaceae)	NI, US	L, P/F	N	Y	CABI, 2000; CMI, 1996
Xanthomonas axonopodis pv. *phaseoli* (Smith) Vauterin [=*X. campestris* pv. *phaseoli* (Smith) Dye, *X. phaseoli* (ex Smith) Gabriel] (Xanthomonadales: Xanthomonadaceae)	NI, US	L, P/F	N	Y	CABI, 2000; CMI, 1971e; Hall, 1991
FUNGI					
Aristastoma oeconomicum (Ellis & Tracy) Tehon (Deuteromycotina: Coleomycetes)	NI, US	L	N	N	Allen, *et al.*, 1998; ARS, 1960; ARS, 2000; Wellman, 1977
Ascochyta cruenta Sacc. [10] (Deuteromycotina: Coleomycetes)	CR, HN	L, P/F	Y	Y	Wellman, 1977

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Botrytis cinerea Pers.:Fr. [= *Sclerotinia fuckeliana* (de Bary) Fuckel, teleomorph *Botryotinia fuckeliana* (de Bary) Whetzel] (Deuteromycotina: Hyphomycetes)	4C, US	L, P/F	N	Y	ARS, 1960; ARS, 2000; CMI 1974; Wellman, 1977
Cercospora canescens Ellis & Martin (Deuteromycotina: Hyphomycetes)	NI, US	L, S, P/F	N	Y	Allen, *et al.*, 1998; ARS, 1960; ARS, 2000; CABI, 2000; CMI 1975a; Crandall, *et al*., 1951; Litzenberger and Stevenson, 1957
Chaetoseptoria wellmanii Steven. (Deuteromycotina: Coleomycetes)	4C, CR, HN, US	L	Y	N	Allen, *et al.*, 1998; ARS, 2000; CMI, 1985a; Crandall, *et al.*, 1951; Muller, 1953; Wellman, 1977
Cladosporium vignae Gardner (Deuteromycotina: Hyphomycetes)	4C, US	Fw, L, P/F	N	Y	Allen, *et al.*, 1998; ARS, 1960; ARS, 2000; Wellman, 1977
Cochliobolus heterostrophus (Dresch.) Dresch. (Loculoasco-mycetes: Dothidales)	NI, US	L, S	N	N	CABI, 2000; CMI, 1971a; CMI, 1981a

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Cochliobolus lunatus Nelson & Haasis (Loculoascomycetes: Dothidales)	Cosmopolitan	L, S	N	N	CABI, 2000; CMI, 1975b
Cochliobolus sativus (Ito & Kuribayashi) Dresch. ex Dastur (Loculoascomycetes: Dothidales)	CR, HN, NI, US	W	N	N	CABI, 2000; CMI 1981b; CMI 1986a
Colletotrichum lindemuthianum (Sacc. & Magnus) Lams.-Scrib. (Deuteromycotina: Coleomycetes) [Teleomorph *Glomerella lindemuthiana = G. cingulata*]	CR, HN, NI, US	L, P/F, S	N	Y	Allen, *et al.*, 1998; ARS,1960; ARS, 2000; CABI, 2000; CMI 1971d; CMI 1978a; Wellman, 1977
Corynespora cassiicola (Burk. & Curtis) Wei (Deuteromycotina: Hyphomycetes)	Cosmopolitan	L, P/F, S	N	Y	Allen, *et al.*, 1998; ARS, 2000; CABI, 2000; CMI 1971b; Wellman, 1977
Elsinöe phaseoli Jenk. in Bruner & Jenk (Loculoascomycetes: Dothidales)	4C, US	L, P/F, S	N	Y	Allen, *et al.*, 1998; CMI 1971c; CMI 1984; Wellman, 1977

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Erysiphe polygoni + DC (Pyrenomycetes: Erysiphales)	NI, US	L	N	N	Allen, *et al.*, 1998; ARS, 1960; ARS, 2000; Crandall, *et al*., 1951; Litzenberger and Stevenson, 1957
Fusarium oxysporum Schlechtend:Fr. f. sp. *tracheiphilium* (E.F.Sm.) Snyd. & Hans. (Deuteromycotina: Hyphomycetes)	4C, US	L,P,W	N	Y	CMI, 1970b; Costa Rica, 1989; Farr, *et al.*, 1989
Fusarium solani + (Mart.) Sacc. (Deuteromycotina: Hyphomycetes)	4C, US	R	N	N	Allen, *et al.*, 1998; ARS, 2000; CMI 1964b; Wellman, 1977
Fusarium solani (Mart.) Sacc. f. sp. *phaseoli* (Burkholder) Snyd. & Hans. (Deuteromycotina: Hyphomycetes)	4C, US	R,St	N	N	Costa Rica, 1989; Farr, *et al*., 1989
Gibberella fujikuroi (Sawada) Ito in Ito & Kimura (Pyrenomycetes: Hypocreales)	CR, HN, NI, US	W	N	Y	CABI, 2000; CMI 1964a; CMI 1977

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Glomerella cingulata (Stoneman) Spauld. & H. Schrenk. [Anamorph = *Colletotrichum gleosporioides* (Penz.) Penz. & Sacc. in Penz.] (Pyrenomycetes: Phyllachorales)	CR, HN, NI, US	W	N	Y	ARS, 1960; ARS, 2000; CABI, 2000
Lasiodiplodia theobromae (Pat.) Griff.& Maubl. [=*Botryodiplodia theobromae* Pat.] (Deuteromycotina: Coleomycetes)	CR, HN, NI, US	P/F, S	N	Y	CABI, 2000; CMI 1976a; CMI Map 1985b
Macrophoma subconica Ellis & Everh. (Deuteromycotina: Coleomycetes)	4C, US	S	N	N	ARS, 1960; ARS, 2000; Wellman, 1977
Macrophomina phaseolina (Tassi) Goidanich [= *M. phaseoli* (Maubl) Ashby] (Deuteromycotina: Coleomycetes)	HN, US	Seedling or W	N	N	Allen, *et al.*, 1998; ARS, 1960; ARS, 2000; CABI, 2000; CMI, 1970a; CMI 1985c; Hall, 1991; Wellman, 1977

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Mycosphaerella + cruenta D. H. Latham. [anamorph *Pseudocercospora cruenta*] (Loculoascomycetes: Dothidales)	NI, US	L, P/F, S	N	Y	Allen, *et al.*, 1998; ARS, 1960; ARS, 2000; CABI, 2000; CMI 1990; Litzenberger and Stevenson, 1957; Wellman, 1977
*Mycosphaerella + pinode*s (Berk. & Bloxam) Vestergr. [*Didymella pinodes* (Berk. & Bloxam) Petrak] (Loculoascomycetes: Dothidales)	HN, US	L, P/F, S	N	Y	ARS, 1960; ARS, 2000; CABI, 2000; CMI, 1972; CMI 1979b; Wellman, 1977
Phaeoisariopisis + griseola (Sacc.) Ferraris [*Isariopsis griseola* Sacc.] (Deuteromycotina: Hyphomycetes)	NI, US	L, P/F	N	Y	CABI, 2000; CMI, 1986c; CMI, 1986b; Wellman, 1977
Phyllosticta phaseolina Sacc. (Deuteromycotina: Coleomycetes)	CR, US	L	N	N	Costa Rica, 1989; Farr, *et al*., 1989
Protomicopsis phaseoli Ramakr. & Subra. [11] (Ascomycotina: Protomycetales)	CR	L	Y	N	Adejumo, *et al.*, 1999; Costa Rica, 1989; CPC, 2001

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quarantine Pest[3]	Likely to Follow Pathway[3]	References
Pseudocercospora + *cruenta* (Sacc.) Deighton [teleomorph *Mycosphaerella cruenta* Latham] (Deuteromycotina: Hyphomycetes)	HN, NI, US	L, P/F, S	N	Y	ARS, 2000; CABI, 2000; Litzenberger and Stevenson, 1957
Pythium aphani- + *dermatum* (Edson) Fitzp. (Oomycetes: Peronosporales)	4C, CR, US	S,W	N	N	Allen, *et al.*, 1998; CABI, 2000; CMI, 1964c; CMI, 1978b
Pythium splendens Braun (Oomycetes: Peronosporales)	CR, US	S,W	N	N	CMI, 1966; Costa Rica, 1989; Farr, *et al*., 1989
Sclerotinia sclerotiorum (Lib.) de Bary (Discomycetes: Helotiales)	Cosmopolitan	W	N	Y	ARS, 1960; ARS, 2000; CABI, 2000; CMI, 1976b; Wellman, 1977
Sclerotium rolfsii Sacc. (Deuterocomytina: Agronomycetes)	4C, NI, US	R, S	N	N	Allen, *et al.*, 1998; ARS, 1960; ARS, 2000; Litzenberger and Stevenson, 1957; Wellman, 1977

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Thanatephorus cucumeris (A. B. Frank) Donk [=*Pellicularia filamentosa* (Pat.) D. P. Rogers; anamorph *Rhizoctonia solani* Kuhn] (Basidiomycetes: Tulasnellales)	CR, HN, US	W	N	Y	Allen, *et al.*, 1998; ARS, 2000; CABI, 2000; Costa Rica, 1989; Crandall *et al*., 1951
Thielaviopsis basicola (Berk. & Broome) Ferraris (Deuteromycotina: Hyphomycetes)	4C, CR, US	W	N	Y	ARS, 2000; CABI, 2000; CMI, 1968; CMI, 1979a
Uromyces appendiculatus (Pers.:Pers) Unger (Basidiomycetes: Uredinales)	CR, HN, NI, US	L	N	N	Allen, *et al.*, 1998; ARS, 1960; ARS, 2000; CABI, 2000; CMI, 1965
Uromyces vignae Barclay [=*Uromyces phaseoli* (Pers.) Wint. var. *vignae* (Barclay) Arth.] (Basidiomycetes: Uredinales)	4C, US	L,P,W	N	Y	Costa Rica, 1989; Farr *et al*., 1989; Hall, 1991

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
NEMATODES					
Belonolaimus longicaudatus Rau (Tylenchida: Belonolaimidae)	CR, US	R	N	N	CABI, 2001; Minton and Baujard, 1990
Helicotylenchus dihystera (Cobb) Sher. (Tylenchida: Hoplolaimidae)	CR, US	R	N	N	CABI, 2001; Whitehead, 1998
Helicotylenchus multicinctus (Cobb) Golden (Tylenchida: Hoplolaimidae)	NI, US	R	N	N	CABI, 2001; Whitehead, 1998
Hoplolaimus seinhorstii Luc (Tylenchida: (Hoplolaimidae)	CR, US	R	Y	N	CABI, 2001
Meloidogyne arenaria (Neal) Chitwood (Tylenchida: Meloidogynidae)	CR, US	R	N	N	CABI, 2001; Sikora and Greco, 1990; Whitehead, 1998
Paratrichodurus minor (Colbran) Siddiqi (Triplonchida: Trichodoridae)	NI, US	R	N	N	CABI, 2001; Whitehead, 1998
Pratylenchus brachyurus (Godfrey) Filipjev & Schuurmans Steckhoven (Tylenchida: Pratylenchidae)	CR, US	R	N	N	ARS, 1960; CABI, 2001; Minton and Baujard, 1990; Whitehead, 1998

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Pratylenchus penetrans (Cobb) Filipjev & Schuurmans Steckhoven (Tylenchida: Pratylenchidae) +	CR, US	R	N	N	Anon., 1984; CABI, 2001; Whitehead, 1998
Rotylenchulus reniformis Lindford & Olivera (Tylenchida: Rotylenchulidae) +	NI, US	R	N	N	CABI, 2000; Riggs and Niblack, 1993; Sikora and Greco, 1990
Scutellonema bradys (Steiner & Le Hew) Ansdrássy (Tylenchida: Hoplolaimidae) +	4C, US	R	N	N	Anon., 1984; CABI, 2001; Whitehead, 1998
VIRUSES					
Bean common mosaic virus - serotype A [=*Bean common mosaic necrosis virus*] (Potyviridae: Potyvirus)	CR, US	W	N	Y	Brunt, *et al.*, 1997; CABI, 2001
Bean golden mosaic virus[12] (Geminiviridae: Begomovirus)	CR, US (FL)	W	N	Y	Brunt, *et al.*, 1997; CABI, 2001; Hall, 1991

Pest (Taxonomic Classification)	Geographic Distribution	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Bean southern mosaic virus-strain C [= *Southern bean mosaic virus*] (Tetraviridae: Sobemovirus)	NI, US	W	N	Y	Allen, *et al.*, 1998; Brunt, *et al.*, 1997; CABI, 2001
Bean yellow mosaic virus (Potyviridae : Potyvirus)	Cosmopol-itan	W	N	Y	Brunt, *et al.*, 1997; CABI, 2001; Šutiƒ, *et al.*, 1999
Cowpea chlorotic mottle virus [=*Bean yellow stipple*] (Bromoviridae: Bromovirus)	CR, US	W	N	Y	Brunt, *et al.*, 1997; CABI, 2001; Hartman *et al.*, 1999
Cowpea mosaic virus [=*Cowpea yellow mosaic virus*] (Tombusviridae: Comovirus)	CR, NI, US	W	N	Y	Allen, *et al.*, 1998; Brunt, *et al.,* 1996; Šutiƒ, *et al.*, 1999; Wellman, 1977
Cowpea severe mosaic virus (Tombusviridae: Comovirus)	CR, US	W	N	Y	Allen, *et al.*, 1998; Brunt, *et al.,* 1997; CAB, 2001; CMI/AAB, 1979; Šutiƒ, *et al.*, 1999
Cucumber mosaic virus + (Bromoviridae: Cucmovirus)	CR, HN, US	W	N	Y	Allen, *et al.*, 1998; Brunt, *et al.*, 1997; CABI, 2000; Gillaspie, Jr., 1998

Pest (Taxonomic Classification)	Geographic Distribution[1]	Plant Part Affected[2]	Quaran-tine Pest[3]	Likely to Follow Pathway[3]	References
Peanut mottle virus (Potyviridae: Potyvirus)	4C, US	W	N	Y	Brunt, *et al.*,1997; CABI, 2001; Hall, 1991

+ = pests reported from yard-long-bean.

[1] When not reported from Nicaragua, quarantine pests that may follow the pathway into the United States from the two adjoining countries Costa Rica and Honduras and unspecified areas of Central America, are not further analyzed in Tables 3-5. AZ = Arizona, CR = Costa Rica, FL = Florida, HI = Hawaii, HN = Honduras, NI = Nicaragua, PR = Puerto Rico, TX = Texas, US = United States, 4C = Central America, Cosmopolitan = widely distributed over the world.

[2] Fw = Flowers, L = Leaves, P/F = Pods (fruit), S = Stems, Sd = Seeds, R = Roots, W = Whole plant. Seedling or W = the pathogen kills the seedling or if not, later on it kills the whole plant.

[3]Y = Yes, N = No.

[4]*Cerotoma ruficornis atrofasciata* (Jacoby) and *C. ruficornis rogersi* Jacoby listed by various authors cited in this study are synonyms of *C. ruficornis* Olivier. (Telephone communication with Dr. A. Konstantinov, Systematic Entomology Laboratory, Smithsonian Institution, Washington, DC, 2000).

[5]*Cydia fabivora* (Meyrick) (Lepidoptera: Tortricidae), present in Costa Rica, is a serious pod and stem borer pest (CABI, 2001). Larvae of *C. fabivora* pupate in the pod. The species has been confused with *Epinotia aporema* (Stansly and Sanchez, 1990; Schoonhoven,1978). Mung beans, *V. radiata,* from Nicaragua must be treated with methyl bromide if they are infested with *C. fabivora, E. aporema,* or *M. vitrata* (Federal Register, 1996). Because it is not recorded specifically from yard-long-beans or from cowpeas, the pest is not considered further in this analysis. Because it also is not reported in Nicaragua, *E. aporema* is not analyzed further although it presents a high risk of following the pathway. The pest is reported from cowpea and common bean from Costa Rica and Texas (Oakley, 1953, APHIS, 2000). The numbers of APHIS interceptions of *E. aporema* in the pods/fruit of *Phaseolus* spp., and *V. unguiculata* which have been recorded (USDA, 2000) from Central American countries are: Costa Rica (1), and Honduras (2).

[6] *Diaphania indica* has not been reported from Nicaragua, therefore it is not further analyzed in Tables 3-5. It is a quarantine pest when intercepted from all foreign sources. It has been reared-out in Costa Rica from hosts other than *Vigna* sp. (Janzen, 2001).

[7] *Dysmicoccus neobrevipes* has not been reported from Nicaragua, therefore it is not further analyzed in Tables 3-5. It has, however, been found on yard-long-bean in other countries. It is a quarantine pest when intercepted from all foreign sources.

[8] Maes and Robleto (1988) listed *E. tredecimpunctata immaculicollis* (author not specified) as a pest of *Vigna unguiculata* in Nicaragua. Gordon (1975) lists *Coccinella immaculicollis* Chevrolat from Central America as a synonym of *E. tredecimnotata.*

[9] *Maruca vitrata* is reported from Nicaragua associated with common bean, *Phaseolus vulgaris*, and soybean, *Glycine max*, (Maes and Robleto, 1988). *M. vitrata* infests the pods of *Vigna* spp. in all of the other countries in Central America. *M. vitrata* is known to be a pest of Fabaceae spp., including asparagus-bean, in Costa Rica and Honduras (Oakley, 1953). In addition, *M. vitrata* is reported on beans, (*Phaseolus* spp.) and cowpea in Costa Rica, Honduras, and the United States (Hawaii and Texas) (CABI, 2000; Zhang, 1994). There is no evidence that *M. vitrata* is established in Texas (Solis, 2000). In addition, *M. vitrata* is reported as a pest of yard-long-bean in China (Ke, *et al.*, 1985) and Malaysia (Julius, *et al.*, 1992). Because of its presence in Nicaragua and association with yard-long-bean outside of Nicaragua, the pest is included in Tables 3-5.

[10] A single unconfirmed report with no supporting evidence lists *Ascochyta cruenta* as occurring on cowpea in Costa Rica and Honduras. However, *Ascochyta cruenta* has not been reported from Nicaragua. Because *A. cruenta* is considered a quarantine pest, if found and intercepted quarantine action will be required.

[11] *Protomycopsis phaseoli* is a leaf pathogen reported to occur in Costa Rica, but not found in the United States. Quarantine 56 (Title 7, Code of Federal Regulations, Part 319.56) requires that shipments of fruits and vegetables be free of leaves and stems. If *Protomycopsis phaseoli* is intercepted, quarantine action will be required.

[12] Bean golden mosaic virus (BGMV) occurs in tropics and subtropics of the New World (CABI, 2000). Within the US, it has been reported in two eastern sub-tropical and tropical areas (Puerto Rico and Florida) but not in central or western areas. The virus has been reported in Nicaragua but the report is unconfirmed (CABI, 2000). In Florida, the virus has been reported in *Phaseolus vulgaris* (bean) but not cowpea (Alfieri, Jr., *et al.*, 1994). Because BGMV is present in the United States and there are no domestic quarantine regulations restricting the movement of beans in the United States based on its presence, the virus is not considered a quarantine pest and is not carried forward to Tables 3-5.

E. List of Quarantine Pests

Our list of quarantine pests for yard-long-bean or cowpea from Nicaragua is provided in Table 3. Should any of these pests be intercepted from commercial shipments or other, quarantine action may be taken.

Table 3: Quarantine Pests: *Vigna unguiculata* subsp. *sesquipedalis*	
Arthropods	
Acanalonia excavata *Aceratagallia* sp. *Acromyrmex* sp. *Agallia* sp. *Aleurodicus dispersus* *Anypotactus jansoni* *Carneocephala* sp. *Chlorotettix emarginatus* *Colaspis hypochlora* *Colaspis splendida* *Cydia fabivora* *Cyrpoptus suavis* *Delphacodes fulvidorsum* *Deltocephalus* sp. *Diabrotica adelpha* *Diabrotica octoplagiata* *Diaphania indica* *Draeculacephala clypeata* *Dysmicoccus neobrevipes* *Empoasca* sp. *Empoasca kraemeri*	*Empoasca kraemeri* *Epilachna tredecimpunctata immaculicollis* *Epinotia aporema* *Epitrix convexa* *Exitianus* sp. *Graminella* sp. *Gypona* sp. *Gyponana flavilineata* *Lema obscura* *Maruca vitrata* *Metachroma inconstans* *Nodonota lefevrei* *Octotoma scabripennis* *Olliarianus* sp. *Oncometopia clarior* *Pantomorus femoratus* Phycitinae sp. *Scaphytopius* sp. *Sibovia occatoria* *Stenygra histrio* *Stirellus bicolor* *Systena s-littera*
Fungi *Ascochyta cruenta* *Chaetoseptoria wellmanii* *Protomicopsis phaseoli*	

F. Quarantine Pests Not Selected for Further Analysis

None of the pests in Table 3, except for *Maruca vitrata*, qualified for further risk analysis because they are not associated with fresh pods of the commodity, they are not reasonably expected to remain as contaminants found during inspections of the commodity, or they are not expected to be found with commercial shipments. For these reasons, these quarantine pests are not considered to pose a risk of plant pest introduction.

G. Quarantine Pests Selected for Further Analysis

Only one quarantine pest from Nicaragua is likely to follow the pathway of introduction.

Table 4: Quarantine Pests in the Pathway of Introduction Selected for Further Analysis: *Vigna unguiculata* subsp. *sesquipedalis* from Nicaragua
Maruca vitrata

The qualitative pest risk analysis of the quarantine pests listed in Table 2 begins with a compilation and analysis of basic biological information about each pest. Subsequently, each risk element is examined. In this risk assessment, the guideline material for each risk element is presented followed by a statement of the findings of an expert panel. Each risk assessment rating was made by a panel of plant pathologists and entomologists who were presented with biological information. The expert panels developed consensus by considering the totality of the biological information that was available. The ratings of Low, Medium, or High represent their expert interpretation of biological information based on their knowledge and experience.

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H. Consequences of Introduction

Pest species listed in Table 2 that have a "Y" in the "Quarantine Pest" column, are considered to be a quarantine pests if found on imports of the fresh immature pods/fruit of yard-long-bean from Nicaragua. If such a pest is found on commercial or other shipments quarantine action may be taken. A pest listed as an "N" in the quarantine pest column is not considered a quarantine pest. A pest listed as an "N" in the "Likely to Follow Pathway" column is not likely to be present with the specific stage of the commodity at the time of harvest and packing, *i.e*., pods. Pests recorded from Nicaragua that have both a "Y" in the "Likely to Follow Pathway" column and a "Y" in the "Quarantine Pest" column were selected for further analysis in Tables 3, 4 and 5 (USDA, 2000). One pest is considered for further analysis.

Table 3. Risk Rating for Consequences of Introduction

Pest Species	RE #1 Climate/ Host Interaction	RE #2 Host Range	RE #3 Dispersal Potential	RE #4 Economic Impact	RE #5 Environ-mental Impact	Cumulative Risk Rating
Maruca vitrata	Medium 2	Medium 2	High 3	High 3	Medium 2	Medium 12

I. Likelihood of Introduction

The ratings for the six sub-elements (S-E) concerning the "Likelihood of Introduction" are shown in Table 4.

Table 4. Risk Rating for Likelihood of Introduction							
Pest Species	S-E #1 Quantity imported annually	S-E #2 Survive post-harvest treatment	S-E #3 Survive shipment	S-E #4 Not detected at port of entry	S-E #5 Moved to a suitable habitat	S-E #6 Contact with host material	Cumulative Risk Rating
Maruca vitrata	Medium 2	High 3	High 3	High 3	High 3	High 3	High 17

J. Conclusions

The pest risk potential ratings listed in Tables 3 and 4 for *Maruca vitrata* are summarized in Table 5.

Table 5. Pest Risk Potential			
Pest Species	Consequences of Introduction	Likelihood of Introduction	Pest Risk Potential[1]
Maruca vitrata	Medium 12	High 17	High 29

[1]Risk Potential (USDA, 2000).

Pest risk potential ratings have the following meanings (USDA, 2000):

"Low: Pest will typically not require specific mitigation procedures. The port-of-entry inspection to which all imported commodities are subjected can be expected to provide sufficient phytosanitary security.
Medium: Specific phytosanitary measures may be necessary.
High: Specific phytosanitary measures are strongly recommended. Port-of-entry inspection is not considered sufficient to provide phytosanitary security."

According to the Guidelines (USDA, 2000), a choice of an appropriate phytosanitary measures to mitigate the high quarantine pest risk posed by *Maruca vitrata* for yard-long-bean from Nicaragua will be based on the present risk assessment. The Federal Register (1996) provides for a treatment for mung bean pods from Nicaragua when intercepted with this pest.

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