Importation of *Zea mays* seed for Propagation From the Ukraine into the United States

Qualitative, Pathway-Initiated Pest Risk Assessment

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Agency Contact:

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A. Introduction

This pest risk assessment was prepared by the Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture (USDA) to examine plant pest risks associated with the importation of corn seed (*Zea mays)* grown in the Ukraine. This is a qualitative pest risk assessment, that is, estimates of risk are expressed in qualitative terms such as high or low as opposed to numerical terms such as probabilities or frequencies.

International plant protection organizations (*e.g.*, North American Plant Protection Organization (NAPPO), International Plant Protection Convention (IPPC) of the United Nations Food and Agriculture Organization (FAO)) provide guidance for conducting pest risk analyses. The methods we used to initiate, conduct, and report this plant pest risk assessment are consistent with guidelines provided by NAPPO, IPPC and FAO. Our use of biological and phytosanitary terms (*e.g.*, introduction, quarantine pest) conforms with the *NAPPO Compendium of Phytosanitary Terms* (NAPPO 1995) and the *Definitions and Abbreviations* (Introduction Section) in *International Standards for Phytosanitary Measures, Section 1—Import Regulations: Guidelines for Pest Risk Analysis* (FAO 1995).

Pest risk assessment is one component of an overall pest risk analysis. The *Guidelines for Pest Risk Analysis* provided by FAO (1995) describe three stages in pest risk analysis. This document satisfies the requirements of FAO Stages 1 (initiation) and 2 (risk assessment).

The Food and Agriculture Organization (FAO, 1995) defines "pest risk assessment" as "Determination of whether a pest is a quarantine pest and evaluation of its introduction potential". "Quarantine pest" is defined as "A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled" (FAO, 1995; NAPPO, 1995). Thus, pest risk assessments should consider both the likelihood and consequences of introduction of quarantine pests. Both issues are addressed in this qualitative pest risk assessment.

This document presents the findings of a qualitative plant pest risk assessment. The assessment methods or the criteria used to rate the various risk elements are not described in detail. Details of the methodology and rating criteria can be found in the "template" document: ***Pathway-Initiated Pest Risk Assessment: Guidelines for Qualitative Assessments, version 4.0*** (USDA, 1995); to obtain a copy of the template, contact the individual named in the proposed regulations.

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 the request for USDA authorization to allow imports of a particular commodity presenting a potential plant pest risk. In this case, the importation of seed corn (*Zea mays)* grown in the Ukraine is a potential pathway for introduction of plant pests. Regulatory authority for the importations of corn seed from foreign sources is found in 7 CFR §319.24 and 7 CFR §319.41.

2. Assessment of Weediness Potential of corn, *Zea mays*

Table 1 shows the results of the weediness screening for *Zea mays*. These findings did not require a pest-initiated risk assessment.

Table 1: Process for Determining Weediness Potential of Commodity

Commodity: *Zea mays* L. (field corn, sweet corn, maize, pod corn, popcorn, corn)

Phase 1: *Zea mays* is native to the American tropics, widely cultivated in the United States.

Phase 2: Is the species listed in:

No *Geographical Atlas of World Weeds* (Holm, 1979)
No *World's Worst Weeds* (Holm, 1977)
No *Report of the Technical Committee to Evaluate Noxious Weeds; Exotic Weeds for Federal Noxious Weed Act* (Gunn & Ritchie, 1982)
No *Economically Important Foreign Weeds* (Reed, 1977)
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:

Zea mays is widely cultivated and a commercial crop in the U. S. It is not considered a weed.

* The Weed Science Society of America lists "volunteer corn" only.

3. Previous Risk Assessments, Current Status and Pest Interceptions

3a. Decision history for corn seed

Corn seed has been prohibited from many parts of the world including the Ukraine since 1916. No records were found of any recent pest risk assessments from that part of the world.

3b. Interceptions of weed seeds with corn seed

HOST	PEST	TOTAL
ZEA MAYS (SEED)	CONVOLVULACEAE, SPECIES OF	6
ZEA MAYS(SEED)	EUPHORBIA PRUNIFOLIA (delisted 1995)	1
ZEA MAYS (SEED)	IPOMOEA SP. (not known to occur in the Ukraine)	3
ZEA MAYS (SEED)	IPOMOEA TRILOBA (not known to occur in the Ukraine)	15
ZEA MAYS (SEED)	SOLANUM SP. (not known to occur in the Ukraine)	1

4. Pest List: Pests Associated with *Zea mays* in the Ukraine

Table 2 shows the pest list for Ukraine *Zea mays* which was developed after review of the information sources listed in USDA (1995). The pest list summarizes information on the distribution of each pest, pest-commodity association, and regulatory history.

Table 2: Pest List - Ukraine *Zea mays*

Scientific Name, Classification	Distribution[1]	Comments[2]	References
Pathogens			
Alternaria alternata (Fr.:Fr.) Keissl. (Fungi Imperfecti: Hyphomycetes)	RU,US	c,o,z_{ei}	McGee, 1988
Aspergillus niger Tiegh. (Fungi Imperfecti: Hyphomycetes)	RU,US	o,z_{ei}	Hill, 1987; Arinze *et al.*, 1986
Bipolaris nodulosa (Berk. & M.A. Curtis) Shoemaker (Fungi Imperfecti: Hyphomycetes)	RU,US	a,c,o	Florya, 1974; Farr *et. al.*, 1989
Botrytis cinerea Pers.:Fr. (Fungi Imperfecti: Hyphomycetes)	RU,US	c,o,z_{ei}	Richardson, 1979
Cochliobolus heterostrophus (Drechs.) Drechs. (Loculoascomycetes: Dothideales)	UA,US	o,z_{ei}	Rolev, 1991; Farr *et al.*, 1989
Cochliobolus sativus (Ito & Kurib.) Drechsler ex Dastur (Loculoascomycetes: Dothideales)	RU,US	a,c,o	McGee, 1988; CMI, 1986a
Colletotrichum graminicola (Ces.) G. W. Wils. (Fungi Imperfecti: Coelomycetes)	Worldwide	c,o,z_{ei}	Neergaard, 1977; CMI, 1967
Curvularia lunata Wakk.) Boedijn (Fungi Imperfecti: Hyphomycetes)	Krasnodar region,US	a,c,o	Florya, 1979; Farr *et. al.*, 1989
Diplodia maydis (Ber.) Sacc. (Fungi Imperfecti: Coelomycetes)	RU,US	c,o,z_{ei}	Neergaard, 1977; CMI, 1966
Exserohilum turcicum (Pass.) K.J. Leonard & E. G. Suggs. (Pyrenomycetes: Hypocreales)	UA,US	a,o	Shmaranev *et al.*, 1987; Farr *et al.*, 1989
Fusarium culmorum (Wm. G. Sm.) Sacc. (Fungi Imperfecti: Hyphomycetes)	UA,US	a,c,o,z_{ei}	Teslya, 1984; Farr *et al.*, 1989; Neergaard, 1977
Fusarium graminearum Schwabe (Fungi Imperfecti: Hyphomycetes)[see *Gibberella zeae*]	UA,US	c,o,z_{ei}	Klyuchko *et al.*, 1985; Farr *et al*,. 1989
Fusarium moniliforme var. *lactis* (Fungi Imperfecti: Hyphomycetes)[see *Gibberella fujikuroi*]	UA,US	a,o	Ivashchenko, 1977; Farr *et al.*, 1989
Fusarium oxysporum Schlechtend.:Fr. (Fungi Imperfecti: Hyphomycetes)	UA,US	a,c,o	Teslya, 1984; Farr *et al.*, 1989
Gaeumannomyces graminis (Sacc.) von Arx & Olivier (Pyrenomycetes: Diaporthales)	UA,US	a,c,e,o,z_{ei}	McGee, 1988; CMI, 1984; Neergaard, 1977
Gibberella fujikuroi (Sawada) Ito in Ito & K. Kimura (Pyrenomycetes: Hypocreales)[see *Fusarium moniliforme*]	UA,US	a,o	Kobeleva, 1990; Farr *et al.*, 1989
Gibberella zeae (Schwein.) Petch (Pyrenomycetes: Hypocreales)[see *Fusarium graminearum*]	UA,US	c,o,z_{ei}	Kobeleva, 1990; Farr *et al.*, 1989

Macrophomina phaseolina (Tassi) Goidanich (Fungi Imperfecti: Coelomycetes)	UA,US	a,o,z_{ei}	Klyuchko *et al.*, 1985; Farr *et al.*, 1989; Neergaard, 1977
Nigrospora oryzae (Berk. & Broome) Petch (Fungi Imperfecti: Hyphomycetes)	RU,US	a,c,o,z_{ei}	Florya, 1974; Shurtleff, 1980; Dikaneva, 1973; Neergaard, 1977
Peronosclerospora maydis (Racif.) C. G. Shaw (Oomycetes: Peronosporales)	UA	z_{ei}	Movchan, 1996
Phaeocytostroma ambiguum (Mont.) Petr. in Petr. & Syd. (Fungi Imperfecti: Coelomycetes)	Krasnodar,US	a,o	Florya, 1979; Farr *et al.*, 1989
Physoderma maydis (Miyabe) Miyabe (Chytridiomycetes: Blastocladiales)	RU,US	a,o,z_{ei}	FAO, 1993; Farr *et al.*, 1989; Neergaard, 1977
Puccinia sorghi Schw. (Basidiomycetes: Uredinales)	RU,US	a,c,o	Shurtleff, 1980; Cummins, 1971; CMI, 1978a
Pyricularia oryzae Cavara (Fungi Imperfecti: Hyphomycetes)	RU,US	a,o	EPPO, 1994; FAO, 1993; Farr *et al.,* 1989
Pythium aphanidermatum (Edson) Fitzp. (Oomycetes: Peronosporales)	RU,US	a,c,o	CMI, 1978; Shurtleff, 1980; McGee, 1988
Pythium arrhenomanes Drechs. (Oomycetes: Peronosporales)	RU,US	a,o	FAO, 1993; Farr *et al.,* 1989
Pythium pulchrum Minden (Oomycetes: Peronosporales)	UA,US	o,z_{ei}	Bogachev, 1980; Farr *et al.*, 1989
Rhizopus maydis Bruderl. (Zygomycetes: Mucorales)	UA,US	c,o,z_{ei}	Sidenko, 1981; McGee, 1988
Sclerophthora macrospora (Sacc.) Thirum., C Shaw & Narasimhan (Oomycetes: Peronosporales)	RU,US	o,z_{ei}	McGee, 1988; CMI, 1986
Sclerospora graminicola (Sacc.) J. Schrdt. (Oomycetes: Peronosporales)	RU,US	a,o	McGee, 1988; CMI, 1979a
Sclerotinia sclerotiorum (Lib.) de Bary (Discomycetes: Helotiales)	RU,US	c,o,z_{ei}	Richardson, 1979
Setosphaeria turcica (Luttrell) K J Leonard & E G Suggs (Loculoascomycetes: Dothideales)	RU,US	a,o	McGee, 1988; CMI, 1988
Sporisorium holci-sorghi (Rivolta) K. Vanky (Basidiomycetes: Ustilaginales)	UA,US	o,z_{ei}	Ivashchenko, 1977; Farr *et al.,* 1989
Ustilaginoidea virens (Cke.) Tak. (Fungi Imperfecti: Hyphomycetes)	Worldwide	c,e,o,z_{ei}	Shurtleff, 1980
Ustilago zeae (Beckm.) Unger (Basidiomycetes: Ustilaginales)	UA,US	c,o,z_{ei}	Ivashchenko, 1977; Farr *et al.*, 1989

Bacteria

Erwinia carotovora subsp. *carotovora* (Jones) Bergey	Worldwide	a,o	Bradbury, 1986
Pseudomonas andropogonis (Smith) Staff	RU (Soviet far east),US	a,o	FAO, 1993
Pseudomonas syringae pv. *coronafaciens* (Elliott) Young, Dye & Wilkie	RU,US	a,o	Bradbury, 1986
Pseudomonas syringae pv. *striafaciens* (Elliott) Young, Dye, Wilkie	RU,US	a,o,	Bradbury, 1986

Pseudomonas syringae pv. *syringae* van Hall	RU,US	a,o	Bradbury, 1986
Xanthomonas campestris pv. *holcicola* (Elliott) Dye	RU,US	a,o	Bradbury, 1986

Viruses

Barley stripe mosaic virus	Worldwide	o,z_1	Shurtleff, 1980
Barley yellow dwarf virus	Krasnodar,US	a,d,o	McGee, 1988; CMI, 1969; Plumb, 1992
Brome mosaic virus	Krasnodar,US	a,d,o	Panarin & Zabavina, 1979; Shurtleff, 1980; Brunt *et. al.,* 1996
Maize dwarf mosaic potyvirus	USSR(Uzbekistan), US	a,f,o,z_1	Gorbunova *et al.*, 1980; FAO, 1993
Maize mosaic virus	UA,US	a,f,o	Naumenko, 1973; Brunt *et. al.,* 1996
Oat pseudorosette virus	Western Siberia,US	a,d,o	Smith, 1972; Brunt *et. al.,* 1989
Sugarcane mosaic virus	Worldwide	a,d,o	Panarin *et. al.*, 1979; McGee, 1988; Brunt, *et. al.,* 1996; Artem'eva *et. al.,* 1975
Wheat streak mosaic rymovirus	RU,US	o,z_1	Panarin & Zabavina, 1978; FAO, 1993; Brunt *et. al.,* 1989

Nematodes

Ditylenchus dipsaci (Kuhn) Filipjev	RU,UA,US	a,c,e,o	EPPO, 1994; FAO, 1993; Zinov'ev *et al.,* 1975; Anon., 1984
Heterodera avenae Wollenbeber	UA,US	a,c,e,o	Persondedryver, 1992; Anon., 1984
Heterodera phragmitidis Kazachenko	RU	a	Kazachenko, 1986
Paratylenchus nanus Cobb	UA,US	a,c,e,o	Anon, 1984; Stephanchuk, 1977
Pratylenchus pratensis (de Man) Filipjev	UA,US	a,c,e,o	Anon, 1984; Stepanchuk, 1977

Arthropods

Acarus siro L. (Acariformes:Acaridae)	RU,US	o	Zabirov, 1977
Acronicta rumicis L. (Lepidoptera: Noctuidae)	UA	a,e	Zhang, 1995
Agriotes dahuricus Cand.[Harminius dahuricus](Coleoptera: Elateridae)	Mongolia	a,e	Tsendsuren, 1979
Agriotes gurgistanus (Fald.) (Coleoptera: Elateridae)	Azergaijan	a,e	Agaev, 1981
Agriotes lineatus (L.) (Coleoptera: Elateridae)	RU	a,e	Tsendsuren, 1979; FAO, 1993
Agriotes meticulosus Cand. (Coleoptera: Elateridae)	Mongolia, Azerbaijan	a,e	Tsendsuren, 1979; Agaev, 1981

Agriotes obscurus (L.) (Coleoptera: Elateridae)	RU	a,e	Tsendsuren, 1979; FAO, 1993
Agriotes sputator (L.) (Coleoptera: Elateridae)	Azerbaijan	a,e	Agaev, 1981
Agriotes tauricus (Heyden) (Coleoptera: Elateridae)	Azerbaijan	a,e	Agaev, 1981
Agromyza oryzae (Munakata) (Diptera: Agromyzidae)	Siberia	a,e	Spencer, 1973
Agrotis fucosa Butler (Lepidoptera: Noctuidae)	UA	a,e	Zhang, 1995
Agrotis ipsilon (Hfn.) (Lepidoptera: Noctuidae)	Leningrad,US	a,c,o	Pospelov & Pukhaev, 1981; CIE, 1969a
Agrotis segetum (Denis & Schiffermuller) (Lepidoptera: Noctuidae)	RU,UA	a,e	FAO, 1993; IIE, 1987
Amphimallon solstitialis (L.) (Coleoptera: Scarabaeidae)	Mongol Altai region,RU	a,e	Tsendsuren, 1979
Aphis fabae Scopoli (Homoptera: Aphididae)	Moldavian,US	c,e,o,y	Rabichuk, 1985; CIE, 1963; Maramorosch & Harris, 1981
Aphis gossypii Glover (Homoptera: Aphididae)	Worldwide	c,e,o,y	Blackman & Eastop, 1984
Archips rosanus (L.) (Lepidoptera: Tortricidae)	RU,US	a,c,e,o	Chebotarev, 1978
Autographa gamma L. (Lepidoptera: Noctuidae)	UA	a,e	Zhang, 1995
Cadra cautella Walker (Lepidoptera: Pyralidae)	UA,US	c	Zhang, 1995
Cephitinea colonella (Ersh.) (Lepidoptera: Tineidae)	RU	e	Chebanova, 1980; Don Davis, 1996
Cephitinea colongella Zagul. (Lepidoptera: Tineidae)	RU	e	Chebanova, 1980; Don Davis, 1996
Cephitenea longipennis (Ersh.) (Lepidoptera: Tineidae)	RU	e	Chebanova, 1980; Don Davis, 1996
Cerodontha (Poemyza) incisa (Meigen) (Diptera: Agromyzidae)	UA,US	a,o	Spencer, 1973
Cicadulina mbila (Homoptera: Cicadellidae)	RU	a,e,y	FAO, 1993; Maramorosch, 1981
Cnephasia longana Haworth (Lepidoptera: Tortricidae)	UA,US	a,c	Zhang, 1995
Cnephasia pascuana (Hb.) (Lepidoptera: Tortricidae)	BG	a,e	Kontev, 1973
Cryptolestes ferrugineus (Steph.) (Coleoptera: Cucujidae)	RU,US	c,o	Hill, 1987; Andreev, 1991
Delia platura (Meigen) (Diptera: Anthomyiidae)	RU,US	a,c,o	EPPO, 1994; FAO, 1993; CIE, 1985
Delphacodes (=Toya) propinqua (Fieb.) (Homoptera: Delphacidae)	Turkestan range,US	a,c,,o,y	Kholmuminov & Dubovskii, 1979; Cherry *et. al.*, 1986; Hawkins *et. al.*, 1979; Lockhart *et. al.*, 1986
Earias insulana (Boisduval) (Lepidoptera: Noctuidae)	RU	a,e	EPPO, 1994; FAO, 1993

Eupithecia abbreviata Stephens (Lepidoptera: Geometridae)	UA	a,e	Zhang, 1995
Eurgaster austriaca (Schr.) (Hemiptera: Pentatomidae)	RU,UA	a,e	Hill, 1987; CIE, 1976b
Eurgaster integriceps Put. (Hemiptera: Pentatomidae)	RU,UA	a,e	Hill, 1987; CIE, 1976b; USDA, 1980
Euxoa tritici L. (Lepidoptera: Noctuidae)	UA	a,e	Zhang, 1995
Glycyphagus destructor (Schr.) (Acariformes:Glycyphagidae)	RU,US	c,o	Zabirov, 1977
Gymnoscelis rufifasciata Haworth (Lepidoptera: Geometridae)	UA	a,e	Zhang, 1995
Helicoverpa armigera (Hubner) (Lepidoptera: Nocutidae)	RU,UA	e	FAO, 1993; IIE, 1993
Heliothis peltigera Denis & Schiffermuller (Lepidoptera: Noctuidae)	UA	e	Zhang, 1995
Hydraecia micacea Esper (Lepidoptera: Noctuidae)	UA, WI	a,e	Zhang, 1995
Laodelphax striatella (Fall.) (Homoptera: Delphacidae)	RU,UA	a,e,y	Kholmuminov & Dubovskii, 1979; FAO, 1993; CIE, 1965; Harpaz, 1972
Lethrus apterus (Laxmann) (Coleoptera: Scarabaeidae)	UA	a,e	Fed'ko & Pisarenko, 1977
Loxostege sticticalis (L.) (Lepidoptera: Pyralidae)	RU,UA,US	c,o	Polyakov *et al.*, 1977; Petrukha & Tribel, 1974
Luperina dumerilii Duponchel (Lepidoptera: Noctuidae)	UA	a,e	Zhang, 1995
Luperina testacea Denis & Schiffermuller (Lepidoptera: Noctuidae)	UA	a,e	Zhang, 1995
Macrosiphum euphorbiae (Thomas) (Homoptera: Aphididae)	Worldwide	a,c,o,y	Blackman & Eastop, 1984
Melanotus fusciceps (Gylh.) (Coleoptera: Elateridae)	Azerbaijan	a,e	Agaev, 1981
Mesapamea secalis L. (Lepidoptera: Noctuidae)	UA	a,e	Zhang, 1995
Myzus persicae (Sulzer) (Homoptera: Aphididae)	Worldwide	a,c,o,y	Blackman & Eastop, 1984
Nemapogon granella (L.) (Lepidoptera: Tineidae)	RU,US	c,o	Hill, 1987
Ochropleura praecox L. (Lepidoptera: Noctuidae)	UA	a,e	Zhang, 1995
Oria musculosa (Hb.) (Lepidoptera: Noctuidae)	RU	a,e	Kontev, 1973
Oscinella frit (L.) (Diptera: Chlorophidae)	RU,US	c,o	Koval, 1986
Oscinella pusilla (Mg.) (Diptera: Chlorophidae)	RU	e	Lauva & Shutele, 1976
Ostrinia nubialis Hubner (Lepidoptera: Pyralidae)	RU,UA,US	c,o,y	FAO, 1993; IIE, 1991; Neergaard, 1977
Ostrinia scapulalis Walker (Lepidoptera: Pyralidae)	RU,UA	a,e	Kozakevich, 1978

Oulema (Lema) melanopus (L.) (Coleoptera: Chrysomelidae)	RU,UA,US	a,c,o,y	Bedin, 1971; FAO, 1993; CIE, 1969; Nault *et al.*, 1978
Peridroma saucia Hubner (Lepidoptera: Noctuidae)	UA,US	a,c,o	Zhang, 1995
Phyllotreta vitula Redt. (Coleoptera: Chrysomelidae)	RU	a,e	Naibo, 1974
Pleuroptya ruralis Scopoli (Lepidoptera: Pyralidae)	UA	a,e	Zhang, 1995
Plodia interpunctella Hubner (Lepidoptera: Pyralidae)	UA,US	c,o	Zhang, 1995
Plutella xylostella L. (Lepidoptera: Plutellidae)	UA,HI,NY,UT	c,o	Zhang, 1995
Psammotettix striatus (L.) (Homoptera: Cicadellidae)	Turkestan range,RU,UA,US	a,c,o,y	Kholmuminov & Dubovskii, 1979; Razviazkina *et al.*, 1970; Alekseeva *et al.*, 1988
Rhyzopertha dominica (F.) (Coleoptera: Bostrichidae)	RU,US	c,o	Hill, 1987; Asanov, 1970
Rhopalosiphum maidis (Fitch) (Homoptera: Aphididae)	RU,US	c,e,o,y	Rabichuk, 1985; CIE, 1971; Maramorosch & Harris, 1981
Rhopalosiphum padi (L.) (Homoptera: Aphididae)	UA,US	c,e,o,y	Rabichuk, 1985; CIE, 1971; Maramorosch and Harris, 1981
Selatosomus aeneus (L.) (Coleoptera; Elateridae)	Mongolia	a,e	Tsendsuren, 1979
Selatosomus latus (F.) (Coleoptera: Elateridae)	RU	a,e	Agaev, 1981
Selatosomus spretus (Mannh.) (Coleoptera: Elateridae)	Mongolia	a,e	Tsendsuren, 1979
Sesamia uniformis Dudgn. (Lepidoptera: Noctuidae)	RU	e	EPPO, 1994; FAO, 1993
Sitobion avenae (Fabricius) (Homoptera: Aphididae)	Moldavian,US	c,e,o	Rabichuk, 1985
Sitophilus granarius (L.) (Coleoptera: Curculionidae)	RU,US	c,o	Hill, 1987; Asanov, 1970
Sitophilus oryzae (L.) (Coleoptera: Curculionidae)	RU,US	c,o	Hill, 1987; Asanov, 1970
Sitotroga cerealella (Ol.) (Lepidoptera: Gelechiidae)	RU,US	c,o	Hill, 1987; Zhang, 1995
Spodoptera exigua Hubner (Lepidoptera: Noctuidae)	UA,US	c,e,o	Zhang, 1995
Tanymecus dilaticollis Gylh. (Coleoptera: Cucurlionidae)	UA	a,e	Dyadechko *et al.*, 1971; CIE, 1976a
Tenebrio molitor L. (Coleoptera: Tenebrionidae)	RU,US	c,o	Kaltaev, 1975
Tenebrio obscurus Fabricius (Coleoptera: Tenebrionidae)	RU,US	c,o	Kaltaev, 1975
Tribolium castaneum (Hbst.) (Coleoptera: Tenebrionidae)	RU,US	c,o	Hill, 1987; Kaltaev, 1975
Typhaea stercorea (L.) (Coleoptera: Lycitidae)	RU,US	c,o,z_t	Popova, 1971; Hagstrum, 1994

Tyrophagus longior (Gerv.)(Ascariformes: Acaridae)	RU,US	c,o	Zabirov, 1977

Weeds

Galega officinalis (L.)	RU,US	e,h,competitor in pastures	FAO, 1993
Seteria pallide-fusca (Schumacher) Stapf & Hubbard	RU	e,competitor in cultivated crops	FAO, 1993
Tridax procumbens (L.)	RU,PR,HI	e,competitor in cultivated crops	FAO, 1993

[1] Distribution legend: RU = Russian Federation; UA = Ukraine; BG = Bulgaria; US = United States; HI = Hawaii; NY = New York; UT = Utah; WI = Wisconsin

[2] Comments:
- a = Pest mainly associated with a plant part other than the commodity.
- c = Listed in non-reportable dictionary as non-actionable.
- d = Commodity is unlikely to serve as inoculum source because vector is unknown or does not feed on commodity and/or seed transmission has not been reported in *Zea mays*.
- e = Although pest attacks commodity, it would not be expected to remain with the commodity during processing.
- f = Pest occurs in the U.S. and is not subject to official restrictions and regulations.
- h = Quarantine pest: pest has limited distribution in the U. S. and is under official control as follows: (1) pest listed by name in USDA's pest dictionary, official quarantine action may be taken on this pest when intercepted on this commodity and, (2) pest is a program pest.
- o = Organism does not meet the geographical and regulatory definition for a quarantine pest.
- y = Pest is a vector of plant pathogens.
- z_e = External: Pest is known to attack or infest *Zea* and it would be reasonable to expect the pest may remain with the commodity during processing and shipping.
- z_i = Internal: Pest is known to attack or infest *Zea* and it would be reasonable to expect the pest may remain with the commodity during processing and shipping.

5. List of Quarantine Pests

The list of quarantine pests for commercial shipments of *Zea mays* seed from the Ukraine is provided in Table 3. Should any of these pests be intercepted on commercial (or any other) shipments of *Zea mays*, quarantine action may be taken.

Table 3: Quarantine Pests: Ukraine *Zea mays*

Pathogens	*Peronosclerospora maydis*	
Nematodes	*Ditylenchus dipsaci*	
	Heterodera avenae	
	Heterodera phragmitidis	
	Paratylenchus nanus	
Arthropods	*Agriotes dahuricus*	*Agriotes gurgistanus*
	Agriotes lineatus	*Agriotes meticulosus*
	Agriotes obscurus	*Agriotes sputator*
	Agriotes tauricus	*Agromyza oryzae*
	Agrotis fucosa	*Agrotis segetum*
	Amphimallon solstitialis	*Autographa gamma*
	Cephitinea colonella	*Cephitinea colongella*
	Cephitinea longipennis	*Cicadulina mbila*
	Cnephasia pascuana	*Earias insulana*
	Eupithecia abbreviata	*Eurgaster austriaca*
	Eurgaster integriceps	*Euxoa tritici*
	Gymnoscelis rufifasciata	*Helicoverpa armigera*
	Heliothis peltigera	*Hydraecia micacea*
	Laodelphax striatella	*Lethrus apterus*
	Luperina dumerilii	*Luperina testacea*
	Melanotus fusciceps	*Mesapamea secalis*
	Ochropleura praecox	*Oria musculosa*
	Oscinella pusilla	*Ostrinia scapulalis*
	Phyllotreta vitula	*Pleuroptya ruralis*
	Selatosomus aeneus	*Selatosomus latus*
	Selatosomus spretus	*Sesamia uniformis*
	Tanymecus dilaticollis	
Weeds	*Galega officinalis*	
	Seteria pallide-fusca	
	Tridax procumbens	

6. Quarantine Pests Likely to Follow Pathway (*i.e.*, Quarantine Pests Selected for Further Analysis)

Only those quarantine pests that can reasonably be expected to follow the pathway, *i. e.,* be included in shipments of corn seed were analyzed in detail (see USDA, 1995 for selection criteria). The three weed species were not analyzed further, cleaning equipment should screen out these weed seeds which are smaller tha corn seed. Only quarantine pests listed in Table 4 were selected for further analysis and subjected to steps 7-9.

Table 4: Quarantine Pest Selected for Further Analysis: Ukraine *Zea mays* seeds for propagation
Pathogens ***Peronosclerospora maydis***

7. Economic Importance: Consequences of Introduction

The consequences of introduction was considered for each quarantine pest selected for further analysis. For qualitative, pathway-initiated pest risk assessments, these risks are estimated by rating each pest with respect to five risk elements. A full description of these elements and rating criteria can be found in USDA (1995). Table 5 shows the risk ratings for these risk elements.

Table 5: Risk Rating: Consequences of Introduction

Pest	Climate/ Host	Host Range	Dispersal	Economic	Enviro n- mental	Risk Rating
Peronosclerospora maydis	high	medium	high	high	high	high

8. Likelihood of Introduction

Each pest was rated with respect to introduction potential (*i.e.* entry and establishment). Two separate components were considered. First, the amount of commodity likely to be moved was estimated. More imports leads to greater risk; the results is a risk rating that applies to the commodity and country in question and is the same for all quarantine pests considered. Second, five biological features *i.e.,* risk elements, concerning the pest and its interactions with the commodity were considered. The resulting risk ratings were specific to each pest. Details of elements and rating criteria can be found in USDA (1995). The cumulative risk rating for introduction was considered to be an indicator of the likelihood that a particular pest would be introduced. Table 6 shows the rating for these risk elements.

Table 6: Risk Rating: Likelihood of Introduction

Pest	Quantity of commodity imported annually	Likelihood survive postharvest treatment	Likelihood survive shipment	Likelihood not detect at port of entry	Likelihood moved to suitable habitat	Likelihood find suitable host	Likelihood find suitable host	Risk rating
Peronosclerospora maydis	low	high	high	high	high	high	high	high

9. Conclusion: Pest Risk Potential and Phytosanitary Measures

The measure of pest risk potential combines the risk ratings for consequences and likelihood of introduction as described in USDA (1995). Table 7 shows the estimated pest risk potential for the quarantine pests selected for further analysis for importation of *Zea mays* from the Ukraine.

Table 7: Pest Risk Potential, Quarantine Pests

Pest	Pest risk potential
Peronosclerospora maydis	high

We recommend specific phytosanitary measures for pests recieving a high PRP risk rating; port-of-entry inspection is not considered sufficient to provide phytosanitary security.

APHIS has not yet determined whether risks associated with the importations of *Zea mays* seed from the Ukraine can be managed adequately. Detailed examination and choice of appropriate sanitary and phytosanitary measures to mitigate pest risk is undertaken as part of the pest risk management phase and is not discussed in this document. Appropriate sanitary and phytosanitary measures to mitigate pest risk will be determined during the pest risk management phase.

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