PATHWAY-INITIATED PEST RISK ASSESSMENT

for

Allium porrum (leek) from Japan into Guam and Hawaii

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A. INTRODUCTION

This pest risk assessment (PRA) was conducted by the United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA, APHIS, PPQ) on *Allium porrum* from Japan. The results are expressed qualitatively (high or low), rather than quantitatively (probabilities or frequencies). The risk assessment methodology can be found in: *Pathway-Initiated Pest Risk Assessment: Guidelines for Qualitative Assessments* (USDA, 1995), available from the Agency Contact identified on the front of this Assessment. Regulatory authority for plant pest/plant products is derived from the Plant Quarantine Act (1912), the Plant Pest Act (1957) and the Noxious Weed Act (1974). The methods/terminology used to initiate, conduct and report this PRA are consistent with guidelines provided by FAO (1995) and NAPPO (1995).

B. RISK ASSESSMENT

1. INITIATING EVENT: PROPOSED ACTION

This commodity-based, pathway-initiated, PRA was conducted to assess the risks associated with leeks (*Allium porrum*) from Japan into Guam and Hawaii. The regulating authority for fruit and vegetable importation is 7 CFR 319.56.

2. ASSESSMENT OF WEEDINESS POTENTIAL OF *ALLIUM* SPP.

Table 1: Process for Determining Weediness Potential of Species

Commodity: *Allium porrum* L. (leek, purret) (Syn. = *A. ampeloprasum* var. *porrum* (L) Gay

Phase 1: **Distribution:**

Allium porrum is native to the Mediterranean region and widely cultivated in the United States.

Phase 2: Is the species 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 & Ritchie, 1982)
NO *Economically Important Foreign Weeds* (Reed, 1977)
NO 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:**

Allium porrum does not pose a weediness threat to the United States.

3. PREVIOUS RISK ASSESSMENTS, CURRENT STATUS AND PEST INTERCEPTIONS

DECISION HISTORY

1990 (Dec 4) - Japan - Disapproved entry of fresh green tops (*Allium schoenoprasum*)because of associated rust diseases.

1988 (Aug 29) - Taiwan, Japan - Memorandum recommending the exclusion of *Allium* spp. tops because of the presence of *Liriomyza chinensis* and *Acrolepiopsis manganeutis*.

1970 (Aug 19) - Japan - Admit all species of *Allium* into Guam subject to inspection.

1962 (July 26) - Japan - Decision to admit dry *Allium* to all ports. Recommendation to inspect for rusts and pests of quarantine interest.

INTERCEPTIONS 1985 - 1995

PEST INTERCEPTIONS FROM JAPAN on ALLIUM spp.

PEST	HOST
Acrolepia assectella	green leeks
A. sp. (Acrolepiidae)	*Allium ampeloprasum* (root)
Acrolepiopsis assectella	*A. ampeloprasum* (leaf, stem)
A. assectella	*A. cepa* (leaf, stem)
A. assectella	*A. fistulosum* (leaf)
A. assectella	*A. porrum* (leaf)
A. assectella	*A.* sp. (leaf)
A. sp.	*A. porrum* (leaf)
A. sp. (Acrolepiidae)	*A. ampeloprasum* (leaf)
Agromyzidae, Species of	*A. ampeloprasum* (LEAF)
Agromyzidae, Species of	*A. cepa* (leaf)
Agromyzidae, Species of	*A. fistulosum* (leaf)
Agromyzidae, Species of	*A. porrum* (leaf)
Agromyzidae, Species of	*A.* sp. (leaf)
Amyna sp.	*A. ampeloprasum* (bulb)
Aphelenchoides parietinus	*A.* sp.(nematode)
Aphicchaeta sp.	*A.* sp.
Aphididae, Species of	*A.* sp
Cercospora sp.	*A.* sp. (disease)

Delia sp.	*A.* sp.
Delia sp. (Anthomyiidae)	*A. ampeloprasum* (leaf)
Frankliniella sp.	*A. sp.*
Heterodera goettingiana	*A. ampeloprasum* (soil)
Heterosporium sp.	*A.* sp. (disease)
Histriosoma sp.	*A.* sp.
Mamestra brassicae	*A. ampeloprasum* (leaf)
Mycosphaerella schoenoprasi	*A.* sp. (disease)
M. tassiana	*A.* sp. (disease)
M. sp.	*A. cepa* (leaf)
Oedocephalum glomerulosum	*A. ampeloprasum* (leaf)
O. glomerulosum	*A.* sp. (leaf)
Phoma, Species of	*A.* sp. (leaf)
Phomopsis, Species of	*A.* sp. (leaf)
Phyllosticta sp.	*A.* sp. (disease)
Pleospora sp.	*A.* sp. (disease)
Puccinia sp.	*A.* sp. (disease)
Rhegmoclema atrata	*A.* sp.
Sclerotium sp.	*A.* sp. (disease)
Sphaeronema sp.	*A.* sp. (disease)
Taeniothrips alliorum	*A. ampeloprasum* (stem)
T. sp.	*A.* sp.
Uredo sp.	*A.* sp. (disease)
Uromyces sp.	*A.* sp. (disease)

4. PEST LIST: PESTS ASSOCIATED WITH *ALLIUM* SPP.IN JAPAN

Table 2: Pests Associated with *Allium* spp.			
PEST/PATHOGEN	$Dist_1$	$Comments_2$	References
INSECTS			
Aceria tulipae (Keifer) Acarina:Eriophyidae	JA	g_1, m	Maurai & Sato 1994
Acrolepia alliella Smenov et Kuzneson Lepidoptera:Acrolepiidae	JA	g_1, m	Sato & Yaginuma 1979
A. manganeutis Westw. Lepidoptera:Acrolepiidae	JA	g_1, k, m	Anon. 1965 Shiraki 1952
A. sapporensis Matsumura Lepidoptera:Acrolepiidae	JA	g_1, k, m	Saito 1990

Table 2: Pests Associated with *Allium* spp.			
PEST/PATHOGEN	Dist$_1$	Comments$_2$	References
Acrolepiopsis assectella (Zeller) (=*Acrolepia assectella* (Zeller)) Lepidoptera:Acrolepiidae (Lepidoptera:Yponomeutidae)	JA, HI	g, x, z_i	Interception Record EPPO Database CPPC Hill 1987 CAB Map #405 INKTO #113 CDFA 3:41
Adoretus sinicus Burmeister Coleoptera:Scarabaeidae	GU,JA HI	g, m	CIE 1981, MAP 424 INKTO #89
Agrotis segetum (Denis & Schiffermuller) (=*Euxoa segetum*) Lepidoptera:Noctuidae	JA	g, z_i	Korea 1972 INKTO #25 CAB Map #490 Carter 1984 Hill 1987 Shiraki 1952
Agrotis yosilon Rott. Lepidoptera:Noctuidae	JA	g_1	Shiraki 1952
Aphis gossypii Glover Homoptera:Aphididae	GU,HI JA,US	c, f, k, y_1	Anon. 1994 Beller 1948 Ebeling 1959 Kring 1959 Sako et al 1990
Aporia crataegi (Linnnaeus) Lepidoptera:Pieridae	JA	m	INKTO 149
Araecerus fasciculatus (Deg.) Coleoptera:Anthribidae	GU,JA	f, k	Beller 1946 Nagano 1981
Autographa gamma (Linnaeus) Lepidoptera:Noctuidae	JA	g, k	Whittle 1986 PNKTO #75
Baratha brassicae Schiff. Lepidoptera:Noctuidae	JA	m	Callaghan 1962 Shiraki 1952
Carpocoris pudicus Poda. Heteroptera:Pentatomidae	JA	m	Callaghan 1962 Shiraki 1952
Chromatomyia horticola (Goureau) (= *Phytomyza horticola* Goureau) Diptera:Agromyzidae	JA	g_1, k	CIE 1987, Map 374 Spencer 1973, 1990
Chrysodeixis chalcites (Esper) Lepidoptera:Noctuidae	GU, HI,JA	g, m	Anon. 1994 CIE 1977, MAP 376 Miyake 1980
Chrysodeixis eriosoma (=Phytometra) Lepidoptera:Noctuidae	JA	g, k, m	Ferro 1976 Roberts 1979 Shiraki 1952

Table 2: Pests Associated with *Allium* spp.			
PEST/PATHOGEN	Dist$_1$	Comments$_2$	References
Conogethes punctiferalis (Guenee) (=*Dichocrocis punctiferalis*) Lepidoptera:Pyralidae (Lepidoptera:Pyraustidae)	JA	g, m	INKTO #19
Epilachna vigintioctomaculata Mots. Coleptera:Coccinellidae	JA	g$_1$, m	Shiraki 1952
Eumerus strigatus (Fallen) Diptera:Syrphidae	JA US	f	Shiraki 1952 USDA 1965
Eumeris tuberculatus Rondani Diptera:Syrphidae	JA US	f, k	Tsutsumi *et.al.* 1983 USDA 1965
Graphosoma rubrolineatum Westw. Heteroptera:Pentatomidae	JA	g$_1$, k	Korea 1972 Shiraki 1952
Gryllotalpa africana Palisot de Beauvois Orthoptera:Gryllotalpidae	GU,JA	g, m	Beller 1948 INKTO #197
Haplothrips chinensis Priesner Thysanoptera:Phlaeothripidae	JA	g, k	Shiraki 1952
Helicoverpa armigera (Hubner) Lepidoptera:Noctuidae	GU,JA	g, k	EPPO Database CIE 1993, Map 15 Annecke & Moran 1982 Stapley & Gayner 1969 Ebeling 1959 Carter 1984
Helicoverpa assulta (Guenee) Lepidoptera:Noctuidae	GU,JA	g, m	CIE 1994, MAP 262
Hydraecia mongoliensis Urbahn Lepidoptera:Noctuidae	JA	m	Iinuma & Saito 1988
Hylemya antiqua Meig. (*Delia antiqua*) Diptera:Anthyomyiidae	JA, US	f, k	CIE 1981, Map 75 Shiraki 1952
Hylemya platura (*Delia platura*) Diptera:Anthyomyiidae	HI,JA	f, k	Anon. 1994 Tsutsumi & Mitsui 1987
Hylemya puratura Diptera:Anthyomyiidae	JA	g$_1$, k	Tsutsumi *et.al.* 1983
Icerya aegyptiaca (Douglas) Homoptera:Margarodidae	GU,JA	g, m	CIE 1966, Map 221 INKTO #119

Table 2: Pests Associated with *Allium* spp.			
PEST/PATHOGEN	Dist$_1$	Comments$_2$	References
Liriomyza chinensis Kato Diptera:Agromyzidae	JA	g_1, k, m	Spencer 1973, 1990
Macrosteles orientalis Vilbaste Heteroptera:Deltocephalidae	JA	g_1	Wakibe *et.al.*1983
Maladera orientalis Mots. Coleoptera:Scarabaeidae	JA	g_1, m	Shiraki 1952
Mamestra brassicae (Linnaeus) (=*Barathra brassicae*) Lepidoptera:Noctuidae	JA	g, m, k, x	EPPO Database PNKTO #74
Myzus persicae Homoptera:Aphididae	GU,HI JA,US	f, k, m, y_1	Anon.1994 Miyake 1980 Sako *et.al.* 1990
Neotoxoptera formosana (Takahashi) Homoptera:Aphididae (Mycromyzus formosanus)	HI,JA NA	f, y_1	Anon. 1965 Anon. 1994 Blackman & Eastop 1984 Sako *et.al.* 1990
Phaedon spp. Coleoptera:Chrysomelidae	JA	g_1, m	Barker 1968
Phytobia cepae (Hering) Diptera:Agromyzidae	JA TI	z_i	CAB Map #57 Chang 1972 Chu & Chou 1970 CIE Map #56 Frankenhuyzen 1977
Pieris brassicae (Linnaeus) Lepidoptera:Pieridae	JA	g, m, k	CPPC INKTO #54
Plutella spp. Lepidoptera:Plutellidae	JA	g, m, k	Shiraki 1952
Polia illoba Butl. Lepidoptera:Lymantriidae	JA	m	Shiraki 1952
Popillia japonica Newman Coleoptera:Scrabaeidae	JA US	g, m	FAO Database Shiraki 1952
Psylliodes spp. Coleoptera:Chrysomeliidae	JA	g_1, m	Barker 1968
Rhopalosiphum prunifoliae Fitch Homoptera:Aphididae	JA	f, k m	Shiraki 1952
Spodoptera exigua Hbn. Lepidoptera:Noctuidae	HI,JA US	f, k, m	Anon. 1994 Hayashi *et.al.* 1992

Table 2: Pests Associated with *Allium* spp.			
PEST/PATHOGEN	Dist$_1$	Comments$_2$	References
Spodoptera litura (Fabricius) Lepidoptera:Noctuidae	GU,JA	g, k, m	CIE 1993 Map 61 Korea 1972 CDA BASS 1982 INKTO #12 Shirake 1952
Thrips palmi Karny Thysanoptera:Thripidae	FL,GU HI,JA	g, k, m	FAO Database Anon. 1994 CIE 1992, Map 480
Thrips tabaci Lind. Thysanoptera:Thripidae	GU,HI JA,US	f, k, m	Anon. 1994 Beller 1948 Shiraki 1952
Xestia c-nigrum L. *(=Amathes c-nigrum* L.) Lepidoptera:Noctuidae	JA,US	c	Callaghan 1962 Shiraki 1952 Zhang 1994
MITES			
Caloglyphus spp. Acarina:Acaridae	JA	k, m	Shinkaji *et.al.* 1986
Rhizoglyphus robini Claparede Acarina:Acaridae	JA	f, k, m	Shinkaji *et.al.* 1986
Tyrophagus similis Acarína:Acaridae	JA	f, k, m	Nakao 1991
FUNGUS/PATHOGEN			
Aspergillus niger Tiegh Fungi Imperfecti:Hyphomycetes	GU,HI JA,TI US	c, f, k	Farr 1989 Tanaka 1991 Tsai 1991
Bacillus croci Mizu (=*Erwinia carotovora ssp. carotovora*)	GU,HI JA,US	c, f, k, m	Bradbury 1986 Raabe *et.al.* 1981 Russo *et.al.* 1985 Stevenson 1926
Embellisia allii (Campanile) E. Simmons (*Helminthosporium alii* Campanille) Fungi Imperfecti:Hyphomycetes	JA US	f, k, m	Taniguchi *et.al.* 1994 Farr *et.al.* 1989
Erwinia rhapontici (Millard 1924) Burkholder 1948 Eubacteriales: Enterobacteriaceae	JA US	f, k, m	Ohuchi *et.al.* 1983 Havens 1986 CMI 1981, Map 145 CMI 1977 Description 555 Schwartz & Mohan 1995

Table 2: Pests Associated with *Allium* spp.			
PEST/PATHOGEN	Dist$_1$	Comments$_2$	References
Fusarium oxysporum Schlechtend.:Fr. Fungi Imperfecti:Hyphomycetes	GU,HI JA	g, k, m	Yoo *et.al.* 1991 USDA 1960 Farr *et.al.* 1989 Raabe *et.al.* 1981 Russo *et.al.* 1985
Garlic latent virus (GLV) (Garlic latent carlavirus)	CH,JA KO,TI	k,m	Choi 1995 Sako *et.al.* 1990, 1991, 1994 Fukami & Ishii 1991 Lu 1992 Tsai 1991
Mycosphaerella schoenoprasi (Rabenh.) Wint. Ascomycetes:Loculoascomycetes	JA,TI	k, m, x	Callaghan 1962 Intercepted Tsai 1991
Mycosphaerella tassaiana (Den.) Johans. Ascomycetes:Loculoascomycetes	JA,TI US	f, x	Farr *et.al.* 1989 Tsai 1991
Onion yellow dwarf potyvirus (OYDV)	JA,TI US	f,k,m,x	Fukami & Ishii 1991 Sako *et.al.* 1991 CMI 1984, Map 46 Tsai 1991
Phoma terrestris E.M. Hans. (Syn. *Pyrenochaetia terrestris* (E.M.Hans) Gorenz, J.C. Walker & R.H.Larsen) Fungi Imperfecti:Coelomycetes	HI,JA US	f, k, m	Fujitomi 1990 Raabe *et.al.* 1981 Schwartz & Mohan 1995
Phytophthora allii K. Saw Oomycetes:Peronosporales	JA	k, m	Stevenson 1926
Phytophthora porri Foister Oomycetes:Peronosporales	JA	z_1	Watson 1971 FAO Database CMI 1990, Map #204 CMI 1978, Description #595 Weber 1973
Pseudomonas marginalis pv. marginalis (Brown) Stevens Pseudomonadales:Pseudomonadaecae	JA US	f, k, m	Ohuchi 1983 Havens 1986 CMI 1970, Map 357 French 1989 Schwartz & Mohan 1995
Pseudomonas syringae (Kleb.)Kleb. Pseudomonadales:Pseudomonadaecae	JA US	k,m	Odashima *et.al.* 1993 CMI 1988, Map 336 Bradbury 1986

Table 2: Pests Associated with *Allium* spp.			
PEST/PATHOGEN	Dist$_1$	Comments$_2$	References
Puccinia allii-japonici Diet. Basidiomycetes:Uredinales	JA	k, m	Watson 1971 Callaghan 1962
Sclerotinia allii Sawada Ascomycetes:Discomycetes	JA TI	k, m	Fujioka 1952 Japan 1966 Callaghan 1962 NFC
Sclerotium rolfsii Sacc. southern blight of gyojaninniku (teliomorph *Athelia rolfsii* (Curzi) Tu & Kimbrough Fungi Imperfecti:Agonomycetes	GU,HI JA,US	c, f, k, m	Farr *et.al.* 1989 Fujioka 1952 Nami *et.al.* 1990 Raabe *et.al.* 1981 Russo *et.al.* 1985
Septoria alliacea Cke. Fungi Imperfecti:Coelomycetes	JA	k, m	Watson 1971 NFC
Septoria allii-odori Saw Fungi Imperfecti:Coelomycetes	JA,TI	k, m	Watson 1971 NFC Tsai 1991
Stemphyllium lycopersici (Enjoji) Yamamoto Fungi Imperfecti:Hyphomycetes	JA US	f, k, m	Farr *et.al.* 1989 Watson 1971 CMI 1975, Description #471
Tobacco mosaic tobamovirus rakko str. (TMV-R)	JA US	f, k, m	Kwon & Sako 1994 Sako et al 1991 McRitchie 1981
Uromyces alli-monanthi Harada Basidiomycetes:Uredinales	JA	k, m	Harada 1985
Uromyces ambiguus (DC.) Lev. Basidiomycetes:Uredinales	JA US	f, k, m	Watson 1971 NFC
Uromyces durus Diet Basidiomycetes:Uredinales	JA	k, m	Stevenson 1926 Callaghan 1962 NFC
Uromyces japonicus Berk & Curt Basidiomycetes:Uredinales	JA	k, m	Watson 1971 NFC
Uromyces reticulatus (Thuem.) Bub Basidiomycetes:Uredinales	JA	k, m	Stevenson 1926 Callaghan 1962
MOLLUSCS			
Achatina fulica Bowdich Mollusca:Achatinidae	JA	g, m	FAO Database
NEMATODES			

Table 2: Pests Associated with *Allium* spp.			
PEST/PATHOGEN	$Dist_1$	$Comments_2$	References
Aphelenchoides fragariae (Ritzema Bos.) Christie Aphelenchoidinae	JA US	g, m	FAO Database French 1989 Havens 1986 Soc. of Nematologists 1984
Aphelenchoides parientinus (Bastian) Aphelenchoidinae	HI,JA	m	Intercepted Parris 1940
Ditylenchus dipsaci (Kuhn) Filipjev Tylenchinae	HI,JA US	f, m	Havens 1986 Kuroki 1987 Parris 1940

1. Distribution: CH-Republic of China GU-Guam HI-Hawaii JA-Japan KO-Korea NA-North America TI-Taiwan US-USA
2. Comments:
   - c - Organism does not meet the geographical and regulatory definition for a quarantine pest
   - f - Pest occurs in the U.S. and is not currently subject to official restrictions and regulations (i.e., not listed as actionable or non-actionable, and no official control program)
   - g - Listed in the USDA catalogue of intercepted pests as actionable
   - g_1 - Listed in the USDA catalogue of intercepted pests as actionable at the Genus level
   - k - Not specifically listed for host, but reported from other hosts in same plant genus/family.
   - m - Reported to occur in the PRA area but not on specified host
   - x - Multiple interception records exist
   - y_1 - Pest is a vector of plant pathogens, specifically Garlic Latent Virus which does not occur in the United States
   - z_i- Internal feeder: Pest is known to attack or infect commodity and it would be reasonable to expect the pest may remain with the commodity during processing and shipping

5. QUARANTINE PESTS ON *ALLIUM PORRUM* SELECTED FOR FURTHER ANALYSIS

Acrolepia assectella (Zeller)
Agrotis segetum (Denis and Schiffermuller)
Neotoxoptera formosana (Takahashi)
Phytophthora porri Foister

6. RISK RATING: CONSEQUENCE OF INTRODUCTION

RISK RATING: CONSEQUENCE OF INTRODUCTION						
Pest	Climate / Host Interaction	Host Range	Dispersal Potential	Economic Impact	Environmental Impact	**Risk Rating**
Acrolepia assectella	High	Medium	Medium	Medium	Medium	Medium
Agrotis segetum	High	High	Low	Medium	Medium	Medium
Neotoxoptera formosana[a]	High	High	Medium	Low	Low	Medium
Phytophthora porri	High	High	Medium	Medium	Medium	Medium

a. Vector of Garlic Latent Virus

7. RISK RATING: LIKELIHOOD OF INTRODUCTION

Amount of Commodity Shipped	
Number of 40 foot containers per year	**Score**
< 10	1

Risk Rating: Likelihood of Introduction						
Pest	Survive Postharvest Treatment	Survive Shipment	Not Found at Port of Entry	Imported and Moved to Suitable Environment[1]	Contact with Suitable Host Material	**Risk Rating**
Acrolepia assectella	High	High	Medium	Low	Low	Medium
Agrotis segetum	High	High	Low	Low	Low	Low
Neotoxoptera formosana	High	High	Low	Low	Low	Low
Phytophthora porri	High	High	Medium	Medium[2]	Medium[2]	Medium

1. Assumption: Importation is for consumption, not propagative.
2. Assumption: Some material may end up in backyard compost piles.

8. PEST RISK POTENTIAL

Pest Risk Potential	
Acrolepia assectella	Medium
Agrotis segetum	Medium
Neotoxoptera formosana	Medium
Phytophthora porri	Medium

9. PHYTOSANITARY MEASURES

Most of the significant pests and diseases are associated with the above ground parts of *Allium* spp. Leaf miners are hard to detect. Therefore past decision sheets recommended denial or exclusion of the tops of *Allium* spp. As the pests rated in this Assessment received medium PRP's, specific mitigation measures may be warranted. However, the choice of appropriate sanitary and phytosanitary measures to mitigate the risks is undertaken as a part of Risk Management, and is not addressed in this document.

10. PEST DATA SHEETS

PEST DATA SHEET

Acrolepia assectella (Zeller) (Leek Moth)

IDENTITY

Scientific Name: *Acrolepia assectella* (Zeller)
Alternate Name: *Acrolepiopsis assectella*
Classification: Lepidoptera:Acrolepiidae
Alternate Classification: Lepidoptera:Yponomeutidae
Common Name: Leek Moth

HOSTS

Recorded host plants of the leek moth are in the family Amaryllidaceae, genus *Allium*. Crop losses occur on onions (*A. cepa*), leeks (*A. porrum*), garlic (*A. sativum*) and chives (*A. schoenoprasum*).

DISTRIBUTION

Europe, British Isles, Japan, Hawaii

ECONOMIC IMPORTANCE

Causes heavy damage to leeks, onions and related crops by mining and feeding within the foliage and bulbs in Europe. Damage is followed by extensive rotting. Damage to leek in Italy is reported up to 40%. In the presence of the onion maggot, *Hylemya antiqua*, combined damage to leeks in Holland reached 80 to 90%. Feeding is done within the hollow cylindrical leaf. Larval feeding damage is followed by bacterial and fungal action with subsequent vegetative rotting. New plantings are reported killed by larvae feeding on the growing tip. Seed production is severely reduced when larvae feed in seed stalks thus preventing seed formation.

LIFE HISTORY AND HABITS

The moth flies at night in an irregular zigzag pattern. Copulation occurs in the early morning and lasts for several hours in the spring. Egg laying begins shortly after copulation. Each female lays about 100 eggs placed singly at the base of the onion, leek, garlic or chive plant. Hatching occurs in 5 to 8 days and the young larvae perforates the epidermis and makes a gallery 2 to 5 mm. Long. After about 5 days, the larvae moves to the heart of the plant and bores in all directions. The affected plants yellow at the extremities, the central leaves show perforated and transparent streaks in irregular bands. After 15 to 20 days, the larva leaves the plant and pupates in a cocoon on the foliage or other support. The adult emerges in about two weeks. Overwintering occurs in both the adult and pupal stages. Five or six generations per year are reported for Italy.

REFERENCES

CAB Map #405, INKTO #113, Hill 1985, Interception Records, CPPC, CDFA 3:41, FAO

NOTE
Action Required at ports of entry

PEST DATA SHEET

Agrotis segetum (Denis and Schiffermuller)
Turnip Moth

IDENTITY
Scientific Name: *Agrotis segetum* (Denis and Schiffermuller)
Alternate name: *Euxoa segetum*
Classification: Lepidoptera:Noctuidae
Common Names: Turnip Moth, black/common cutworm, winter moth

HOSTS
Beets, cotton, cucurbits, maize, turnip, sunflower, tomato, lucerne, leeks, grains, potatoes, sweetpottoes, tobacco, green crops in India, crucifers

DISTRIBUTION
Africa, Asia, Europe, Japan, USSR

ECONOMIC IMPORTANCE
This cutworm is a voracious feeder on many wild and cultivated plants. Young nursery stock, field and vegetable crops are reported destroyed in a few days during an outbreak. Reported losses on potatoes and beets in Czechoslovakia ranged from 80 to 100%.

LIFE HISTORY AND HABITS
In Germany, adults become active in mid-May with most of the oviposition occurring in the first half of June. Eggs are laid in batches of 600-700 on stems and lower leaf surfaces of low-growing plants. Larvae hatch in 8 to 14 days, feed until the end of September and hibernate in tunnels in the soil. Pupation occurs in the spring with no resumption of feeding. One generation occurs in Berlin, two in Czechoslovakia and four from Southern Rhodesia. Third and later instars are found under debris or in the soil surface during daytime.

REFERENCES
INKTO #25, CAB Map #490, FAO, Korea 1972, Hill 1987

NOTE
Action Required at ports of entry

PEST DATA SHEET

Neotoxoptera formosana (Takahashi)
Onion Aphid

IDENTITY

Scientific Name: *Neotoxoptera formosana* (Takahashi)
Classification: Homoptera:Aphidae
Common name: Onion Aphid

HOSTS

On the leaves of *Allium* spp. (*ascalonicum, bakeri, chinense, fistulosum, cepae, porum, schoenoprasum, sativum,* etc.) or on bulbs in store.

DISTRIBUTION

Japan, China, Taiwan, Korea, Australia, New Zealand, Hawaii, North America

ECONOMIC IMPORTANCE

Reported as a vector of Garlic Latent Virus(GLV). *N. formosana* was observed to transmit the GLV from *A. fistulosum* or *A. chinense* to *A. chinense* at the rate of 10-30%

LIFE HISTORY AND HABITS

Life cycle is unknown but appears anhyolocyclic almost everywhere. In general, the Aphidoidae are known for both cyclic parthenogensis (amphigony) and host alternation (heteroecy). The impact is a regular seasonal migration between two often distinctly related host plants for specialized morphs. The primary host is used for sexual reproduction and the secondary host is colonized by parthenogenetic morphs.

Both amphigony and heteroecy enabled aphids to successfully exploit food plants, especially short lived herbaceous plants such as agricultural crops.

References

Blackman & Easthop 1984, Sako et al 1990, Iwai 1990

PEST DATA SHEET

Phytophthora porri Foister

IDENTITY
Scientific Name: *Phytophthora porri* Foister
Classification: Fungus

HOSTS
leek, onion, scallion, cabbage, tulip

Distribution
UK, Netherlands, Switzerland, Norway, Japan

ECONOMIC IMPORTANCE
Causes the following diseases: white tip of leek, onion white leaf spot, storage rot of white cabbage, crown rot of *Campanula.* The disease causes the tip portion of leaves and the area toward the bulb to become yellow, die and bleach out to white. Plants may be stunted, and in severe infestations, they collapse.

LIFE HISTORY
Transmission is suggested by wind-blown sporangia from the soil surface to leek leaves.

REFERENCES
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