

# Summer Fruit Tortrix Moth

*Adoxophyes orana*



## Summer Fruit Tortrix Moth

- Native to Europe and Asia, but has yet to establish in the U.S.
- Other common names: smaller tea tortrix, apple peel tortricid.
- Listed as a pest on the CAPS Priority Pest List for 2016 for Oak Commodities.
- Species of leaf roller that is a known pest of commercial fruit and berry crops.



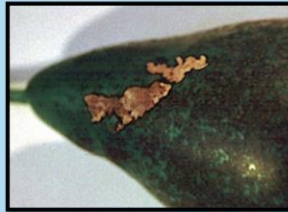
The summer fruit tortrix moth or *Adoxophyes orana* (Fischer von Roslerstamm) is a native pest to Europe and Asia. It has yet to establish in the United States. Some more common names include the smaller tea tortrix, the apple peel tortricid and other names specific to their geography. This leaf roller is known to be a commercial pest of fruits, berries, and other Rosaceous hosts. Specifically, they cause damage to the apple and pear industry annually. As a whole, they have a very wide variety of potential plant hosts which makes them threatening to both crops and ecosystems.

Information sources: 3

# Damage



Damage to apples



Damage to pears



Damage to shoots

Image credits: Larval Damage - D. Bylemans - <http://www.cabi.org/isc/datasheet/11253>



Summer fruit tortrix moth larvae can cause a significant amount of damage to host plants as they feed. Initially, they will eat the leaves of the host and web the damaged leaves together. The shoots can notably wilt or turn yellow as a result. Although this does injure plant tissues, it is not extremely detrimental to the host. However, if fruit becomes available, the larvae will eat and damage the skin of the fruit by creating holes in its surface. Feeding larvae will cause fruit to have a brown and chewed appearance. Moreover, this makes the fruits rot faster after harvest and cannot be readily sold for consumption.

Information Sources: 5, 6

# Global Distribution of the Summer Fruit Tortrix Moth

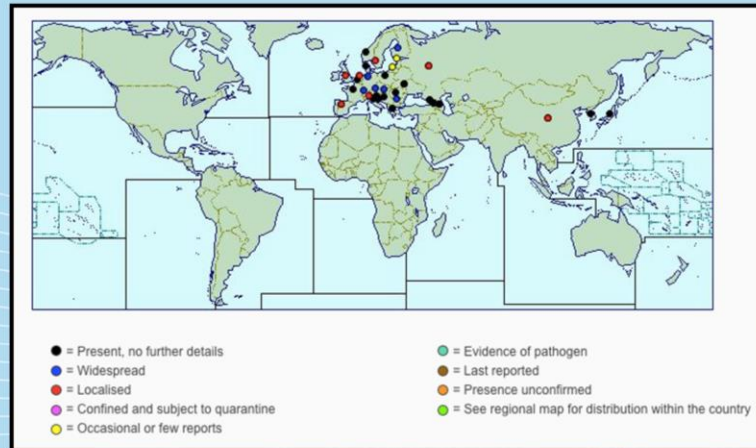


Image credits: Distribution Map - <http://www.cabi.org/isc/datasheet/11253>



The summer fruit tortrix is an established pest in Europe and Asia. It is not yet known to be present in the United States. In the past, it has been caught in agricultural shipments from Europe and Asia to the United States.

Information sources: 3

## Suitable U.S. Climate for Summer Fruit Tortrix Moth



■ Potential areas in the U.S. for the summer fruit tortrix moth to invade.

Image credits: Figure 2 - <https://extension.entm.purdue.edu/CAPS/pdf/datasheets/SummerFruitTortrixMoth.pdf>



The summer fruit tortrix moth is a common pest of Europe and Asia. Although the pest has not yet established in the United States, there is a risk that it eventually will. It is predicted that the summer fruit tortrix moth can potentially invade tropical, subtropical, and temperate areas. The summer fruit tortrix moth has a known geographic range similar to USDA Plant Hardiness Zone 4-11. The eastern United States is at a higher risk for the establishment of *Adoxophyes orana* due to its climate and vegetation. This pest, if introduced to the U.S. could potentially devastate fruit crop industries like apples and pears.

Information sources: 6, 10

# Pest of apples, pears, cherries, and other Rosaceous hosts



Image credits: crabapple and apple (*Malus* spp.) P. Mill - Becca MacDonald, Sault College - Bugwood.org, #5530430; pear (*Pyrus* spp.) L. - Jerry A. Payne, USDA Agricultural Research Service - Bugwood.org, #1229023; pin oak (*Quercus palustris*) Muenchh. - David Stephens - Bugwood.org, #5443458



**protect us.**  
community. innovative. specialist network.  
First Detectors Protecting U.S. from Pests

The summer fruit tortrix moth is known to feed on over 50 species of plants. It preferentially will feed on apples, pears, cherries, and other Rosaceous hosts. Notably, it will cause damages to both the leaves, fruits, berries, and stems of these hosts.

alder (*Alnus* sp.)  
alfalfa (*Medicago* sp.)  
almond tree, flowering (*Prunus triloba*)  
apple (*Malus* sp.)  
apricot (*Prunus armeniaca*)  
ash (*Fraxinus* sp.)  
basewood (*Tilia* sp.)  
birch (*Betula* sp.)  
blackberry (*Rubus fruticosus*)  
blueberry (*Vaccinium* sp.)  
buckbean (*Menyanthes trifoliata*)  
Catawba rosebay (*Rhododendron catawbiense*)  
Cherry (*Prunus* sp.)  
cinquefoil (*Potentilla* sp.)  
common beech (*Fagus sylvatica*)  
common snowberry (*Symphoricarpos albus*)  
cotoneaster (*Cotoneaster dielsiana*)  
cotton (*Gossypium* sp.)  
crabapple, European (*Malus sylvestris*)  
crabapple, Siberian (*Malus baccata*)  
currant, red (*Ribes rubrum*)  
currant, black (*Ribes nigrum*)  
dock (*Rumex* sp.)  
dog rose (*Rosa canina*)  
elm (*Ulmus* sp.)  
field bindweed (*Convolvulus arvensis*)  
filbert (*Corylus* sp.)  
Forsythia, weeping (*Forsythia suspensa*)  
golden chain tree (*Laburnum anagyroides*)  
gooseberry, European (*Ribes* sp.)  
grapevine (*Vitis vinifera*)  
hawthorn (*Crataegus* sp.)  
honeysuckle (*Lonicera* sp.)  
hop (*Humulus* sp.)  
hornbeam (*Carpinus* sp.)  
hornbeam, European (*Carpinus betulus*)  
horsebean (*Vicia faba*)  
ironwood (*Parrotia* sp.)  
Italian woodbine (*Lonicera caprifolium*)  
laburnum (*Laburnum* sp.)  
lambquarters (*Chenopodium album*)  
lilac (*Syringa* sp.)  
maple (*Acer* sp.)  
mastic tree (*Pistacia lentiscus*)  
mulberry (*Morus* sp.)  
nettle (*Urtica* sp.)  
nightshade (*Solanum* sp.)  
oak (*Quercus* sp.)  
peach (*Prunus persica*)  
pear (*Pyrus communis*)  
Peruvian groundcherry (*Physalis peruviana*)  
pillar tree (scientific name unknown)  
pistachio (*Pistacia* sp.)  
plum (*Prunus* sp.)  
poplar (*Populus* sp.)  
privet (*Ligustrum* sp.)  
*Prunus* sp.  
*Pyrus* sp.  
quince (*Cydonia oblonga*)  
raspberry (*Rubus idaeus*)  
*Ribes* sp.  
roses (*Rosa* sp.)  
*Rubus* sp.  
stone fruit  
strawberry (*Fragaria* sp.)  
tea (*Camellia* sp.)  
willow (*Salix* sp.)

Information sources: 6, 12

# Identification

- Adults
  - Pale yellow to brown forewings with brown markings
  - 15-22mm wingspan
  - 8-12mm in length
  - Males are smaller and more colorful than females



Image credit: Falter 1 "Bild" - Heidrun Melzer - [http://www.lepiforum.de/2\\_forum.pl?md=read;id=38042](http://www.lepiforum.de/2_forum.pl?md=read;id=38042); Falter 3 lateral "kein Text" "Bild" - Heidrun Melzer - [http://www.lepiforum.de/2\\_forum.pl?md=read;id=38046](http://www.lepiforum.de/2_forum.pl?md=read;id=38046); Anonymous - [http://www.agroAtlas.ru/en/content/pests/Adoxophyes\\_orana/](http://www.agroAtlas.ru/en/content/pests/Adoxophyes_orana/)



**protect.us.**

community invasive species network  
First Detectives Protecting U.S. from Pests

Adult moths are pale yellow to light brown with darker brown markings on the forewings. The hind wings are lighter yellow or gray and lack the patterns found on the forewings. The wingspan is between 15 and 22mm with a body length of about 8 to 12mm. At a resting state, the moth has a slight bell shape and the hind wings are not visible. Generally, the summer fruit tortrix moths have longer scales on the tip of their wings and abdomen giving it a fringe-like appearance. Although it is still difficult, the adults are in the best life stage for identification. As with many moths, positive identification may require a dissection of the male genitalia.

*Adoxophyes orana* is sexually dimorphic where the males are smaller and slightly more colorful than the females. The darker brown pattern is less apparent on female forewings while the males have very distinct coloration. Ovipositor lobes can be seen on the abdomen of the females whereas males have more long scales covering the tip of the abdomen.

Information sources: 1, 7, 10

## Lookalikes - Adults



*Sparganothis reticulatana*

*Argyrotaenia quadrifasciana*

*Argyrotaenia quercifoliana*

Image credit: CCDS-22978-F11 - BIO Photography Group, Biodiversity Institute of Ontario - <http://www.biodiversity.org/index.php?TaxID=123507>, Reticulated Sparganothis Moth - Robert Lord Zmlich - <http://bugguide.net/node/view/1082822>, Four-lined Leafroller - T. M. Gilligan, S. M. Z. Epstein, Toronto (<http://dbsccc.org/files/ephorta/>), Oak Leafroller - Moth (Argyrotaenia quercifoliana) - Argyrotaenia quercifoliana - 2014 Victoria A. LeFevre - <http://bugguide.net/node/view/942113>



**protect u.s.**

Non-Native Invasive Species Network  
First Detectors Protecting U.S. from Pests

The reticulated sparganothis (*Sparganothis reticulatana*) is a common lookalike of the summer fruit tortrix moth. They feed on a lot of the same hosts including oaks, but the reticulated sparganothis is common in North America. They have a slightly longer wingspan.

Another common lookalike is the four-lined leaf roller (*Argyrotaenia quadrifasciana*). Their wings are slightly more yellow and orange than the summer fruit tortrix moth. These moths are present in Eastern North America and share a similar preferred diet and climate to *Adoxophyes orana*.

Moreover the oak leaf roller (*Argyrotaenia quercifoliana*) physically resembles the summer fruit tortrix moth. The hind wings of this species are more white than brown as in *Adoxophyes orana* and their wingspan is smaller. They feed on a variety of host species and are also seen throughout eastern North America.

Due to the similarities between these species, sometimes a dissection of the male genitalia is required for positive identification.

Information sources: 8, 9, 10, 11



## Identification



- Pupae
  - Light to dark brown
  - 8 to 11mm in length

Image credit: pupa - D. Bylemans - <http://www.cabi.org/isc/datasheet/11253>



Pupae are a light brown chrysalis that will turn a darker brown as the insect gets closer to adult emergence. It is about 8 to 11mm in length. They can be found anywhere on the host plant, but most frequently on leaves or stems. It is also common to see silk surrounding the pupa. The pupa are very similar to many native moth species in North America so it is not the best method for identification.

Information sources: 10

# Identification

- Larvae
  - Yellow-green to dark green body
  - Brown head
  - Up to 20mm long
  - Warts
  - Light hairs



Image credit: larva - D. Bylemans - <http://www.cabi.org/isc/datasheet/11253>



Larvae have yellow-green to dark green bodies that can be up to 20mm long. They are also ornamented with warts and light colored hairs. Their heads are a light to dark brown color. The larvae can be found anywhere on the host and often causes extensive damage to the plant. The youngest larvae typically feed under a silk web on the underside of leaves before moving to the rest of the host.

Information sources: 3, 10, 12

## Identification

- Eggs
  - Yellowish
  - Oval-shaped
  - Circular egg masses
  - Shingle-like rows of 30-50 eggs

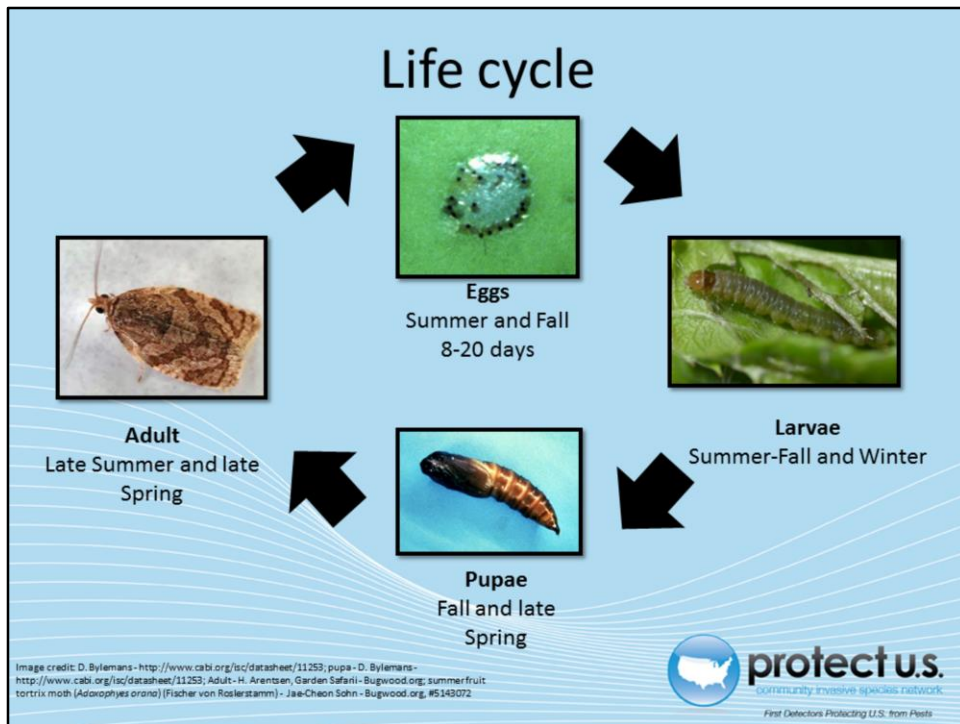


Image credit: D. Bylemans - <http://www.cabi.org/isc/datasheet/11253>



The summer fruit tortrix moth produces circular egg masses that are yellowish in color. The eggs are in a shingle-like formation with rows of 30-50 eggs. Once the eggs hatch, the transparent shell will remain. Typically adults will lay their eggs on the undersides of leaves.

Information sources: 3, 10



The summer fruit tortrix moth can have 2 to 3 generations per year. Adults late emerge in late May or June for first generation in the North Eastern hemisphere. These eggs will hatch in about 8-20 days during the summer months and become transparent right before hatching. The larvae appear towards the end of Summer or early Fall where they feed on plant hosts. The larvae cause the majority of damages to plants and can be extremely harmful to crops during the Summer months. They will go through 5 or 6 instars before pupating. They then become adults during the late Summer or early Fall. These adult moths will lay eggs and the second generation typically appears around Late September where the eggs hatch shortly after. The larvae will overwinter in their 2<sup>nd</sup> or 3<sup>rd</sup> instar, pupate in late Spring, and quickly emerge as adults.

Information sources: 2, 7

# Monitoring



Sex pheromone traps



Robinson light traps

Image credit: pheromone traps - Eugene E. Nelson, Bugwood.org, #5360696; trap - Donald Hobern - <https://www.flickr.com/photos/25401497@N02/7138687407>



The best way to monitor for the summer fruit tortrix moth is by using sex pheromone-baited traps. According to the literature, the most effective sex pheromone to use is a 9:1 blend of (Z)-9-tetradecenyl acetate and (Z)-11-tetradecenyl acetate. This compound is available commercially as Adoxomone. For maintenance of larger areas of crops, the traps should be placed about 45m apart and the pheromone bait should be changed every 6 weeks for best monitoring results. For more intensive monitoring, the traps should be placed 15-20m apart. These traps will attract male moths and are fairly specific to *Adoxophyes orana*. Occasionally, other closely related moth species will also be caught in the traps.

Alternatively, Robinson light traps can be used as a nonspecific method of monitoring. These traps will attract a wide variety of flying insects including *Adoxophyes orana*. The recommended lights to use are 125W mercury vapor bulbs, 125W black light bulbs, or 100W flood lights.

Furthermore, visual sampling and beat sampling can also be used to monitor for the summer fruit tortrix. These methods are more time consuming and are not frequently recommended. In the visual sampling process, look for the presence of larvae in aggregations on the trunk, near fruits or leaves. For beat sampling, it is suggested that 100 shoots be examined.

Information Sources: 6

# Management

- Chemical insecticides
  - Oxadiazine
  - Insect Growth Regulator (IGR)
  - Methoxyfenozide
  - Tebufenozide
  - Fenoxycarb
- Biological insecticides
  - Spinosad
  - *Bacillus thuringiensis* (Bt)
  - Baculovirus
  - Granuloviruses
  - Nucleopolyhedrovirus



For chemical insecticides, it is recommended to use a single application of pesticide 7-10 days after the eggs are laid. The summer fruit tortrix moth has a very wide variety of plant hosts, so chemical treatment is often specific to the invaded plant. For primary hosts such as apples and peaches, some of the different chemicals that can be used are as follows; Oxadiazine, Insect Growth Regulator (IGR), Methoxyfenozide, Tebufenozide, and Fenoxycarb. Oxadiazine targets the sodium channels in the insect nervous system and is effective by ingestion or dermal contact. IGRs interfere with natural insect hormones to cause deformities and sterility. Methoxyfenozide accelerates the molting process of larvae and interrupts female reproduction to prevent successful egg laying. Tebufenozide is an insecticide specific to moths and butterflies and will not harm the bee population. Lastly, Fenoxycarb causes early molting, deformities, and sterility in the summer fruit tortrix moth. As with most insecticides, the development of resistance is possible. It is recommended that chemical treatment is changed for a successive generation of this pest. Chemical recommendations will vary by product and it is important to carefully follow instructions on the labels.

Biological insecticides are also available for defense against *Adoxophyes orana*. Some effective biological insecticides are Spinosad, *Bacillus thuringiensis* (Bt), Baculovirus, Granuloviruses, and Nucleopolyhedrovirus. Spinosad successfully controls both summer and winter generations of the pest. Bt is a bacteria that works as a nonspecific insecticide against moths and butterflies. Baculovirus, granuloviruses, and Nucleopolyhedrovirus have all been noted to infect the summer fruit tortrix moth and decrease reproductive success.

Information sources: 4, 10

## Biological Control



- Insectivorous birds
  - Eat larvae
- Parasitic wasps
  - Control eggs, larvae, and pupae populations

Image credit: Colpoclypeus florus (Eulophid wasp) - Stephen Ausmus, USDA Agricultural Research Service - Bugwood.org, #1355018; Ichneumonid wasp - Gerald J. Lenhard, Louisiana State University - Bugwood.org, #0014109



There are natural larval, pupal, and egg parasitoids of the summer fruit tortrix moth. Some of the more common larval parasitoid were *Colpoclypeus florus*, *Teleutaea striata*, and *Meteorus ictericus*. Larval parasitism by these insects are more common in summer months than the winter. Pupal parasitism is less common, but two species of wasp that display this behavior are *Itopectis maculator* F. and *Pimpla turionella* L. Furthermore, the eggs can be parasitized by several species of Hymenoptera including *Trichogramma dendrolini* Mats. and *T. embryophagum* Htg. When compared to insecticides, it is not as cost effective to rear these natural parasitoids and release them on *Adoxophyes orana* populations, but they still show valuable control methods since many of these are native species in the United States.

Information Sources: 4, 10

# Cultural Control



- General sanitation
- Mulching



Image credit: mulching - Andrew Koeser, International Society of Arboriculture - Bugwood.org, #5375315;  
Joseph O'Brien, USDA Forest Service - Bugwood.org, #5058009



An important cultural control for the summer fruit tortrix moth is general sanitation in nurseries, fields, and gardens. This includes removal of extremely infected hosts and plant debris. Clean cultivation and close monitoring is key. Additionally, mulching the base of hosts can help foster establishment of native parasitoids of the summer fruit tortrix moth to help control the pest population.

Information Sources: 10



# Suspect Sample Submissions

- Contact your State Department of Agriculture or University Cooperative Extension laboratory
  - <http://www.npdn.org/home>
- PPQ form 391, Specimens for Determination
  - [https://www.aphis.usda.gov/library/forms/pdf/PPQ\\_Form\\_391.pdf](https://www.aphis.usda.gov/library/forms/pdf/PPQ_Form_391.pdf)

The image shows a detailed form titled 'PPQ Form 391, Specimens for Determination'. It is a multi-section document with various fields for data entry, including checkboxes and dropdown menus. Key sections include:
 

- SECTION 1: SPECIMENS FOR DETERMINATION** - Fields for collector name, date, and location.
- SECTION 2: REASON FOR IDENTIFICATION** - Multiple choice options for why the sample is being submitted.
- SECTION 3: IDENTIFICATION INFORMATION** - Fields for the name of the pest, its quantity, and the number of samples.
- SECTION 4: PRESENT DISTRIBUTION** - Checkboxes for where the pest is currently found (e.g., lawn, garden, house).
- SECTION 5: PEST IDENTIFICATION** - A table with columns for pest name, number, larvae, pupae, adults, eggs, and other characteristics.
- SECTION 6: IDENTIFICATION METHOD** - Fields for the method used to identify the pest.
- SECTION 7: IDENTIFICATION DETERMINATION** - Fields for the name of the person who identified the pest and their title.
- SECTION 8: IDENTIFICATION OF SPECIMENS** - Fields for the name of the specimen and its location.

An example of a PPQ form for sample submissions

Image credits: [https://www.aphis.usda.gov/library/forms/pdf/PPQ\\_Form\\_391.pdf](https://www.aphis.usda.gov/library/forms/pdf/PPQ_Form_391.pdf)



If a suspect pest has been located in the United States, a sample should be submitted for proper identification. Contact your local diagnostic lab to ship in a sample for identification. Information regarding your local diagnostic lab is available at National Plant Diagnostic Network (NPDN) website. The diagnostic lab information and available contacts are divided by state.

<http://www.npdn.org/home>

The sample specimen should be submitted along with accompanying documentation using the PPQ form 391.

[https://www.aphis.usda.gov/library/forms/pdf/PPQ\\_Form\\_391.pdf](https://www.aphis.usda.gov/library/forms/pdf/PPQ_Form_391.pdf)

Your local diagnostic lab is part of your local cooperative extension service or your state department of agriculture. Your local lab will also have a specific form. All local labs may not be a member of NPDN. However, all labs should report new pest and pathogen detections to local regulatory officials.

## Communications



- Contact your State Plant Health Director
  - [https://www.aphis.usda.gov/aphis/ourfocus/planthealth/ppq-program-overview/ct\\_sphd](https://www.aphis.usda.gov/aphis/ourfocus/planthealth/ppq-program-overview/ct_sphd)



- Contact your State Plant Regulatory Official
  - <http://nationalplantboard.org/membership/>

image credits: <http://www.usda.gov/wps/portal/usda/usdahome>; <http://nationalplantboard.org/>



Remember that new pest and pathogen records must be reported to your State Plant Health Director (SPHD) and your State Plant Regulatory Official (SPRO). The SPRO is a State Department of Agriculture Employee and the SPHD is a USDA-APHIS-PPQ employee.

The link to your SPRO is on the National Plant Board (NPB) website. It has an interactive map and when you click on your state it will take you to another page with contact information. The NPB is a cooperative organization that includes membership from all State Departments of Agriculture.

## Author and Publication Dates

- Morgan Pinkerton
  - Lab Technician, Department of Entomology and Nematology, University of Florida
- Amanda Hodges, Ph.D.
  - Associate Extension Scientist, Department of Entomology and Nematology, University of Florida

Publication date: October 2016



# Reviewers

- Catherine A. Marzolf
  - Assistant State Plant Health Director, USDA APHIS PPQ



## Educational Disclaimer and Citation

- This presentation can be used for educational purposes for NON-PROFIT workshops, trainings, etc.
- Citation: Pinkerton, Morgan and Amanda Hodges. 2016. Summer fruit tortrix moth – *Adoxophyes orana*. Accessed (add the date) – [www.protectingusnow.org](http://www.protectingusnow.org)



## Our Partners

- United States Department of Agriculture, National Institute of Food and Agriculture (USDA NIFA)
- United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA APHIS PPQ)
- Cooperative Agriculture Pest Survey (CAPS) Program
- National Plant Board (NPB)
- States Department of Agriculture
- Extension Disaster Education Network (EDEN)
- Center for Invasive Species and Ecosystem Health (Bugwood)
- National Plant Diagnostic Network (NPDN)
- U.S. Department of Homeland Security (DHS)
- U.S. Forest Service (USFS)



## References

1. Anonymous. 2009. *Adoxophyes orana* (F.R.) - Summer Fruit Tortrix Moth. Interactive Agricultural Ecological Atlas of Russia and Neighboring Countries. Accessed 3/1/2016.
  - [http://www.agroatlas.ru/en/content/pests/Adoxophyes\\_orana/](http://www.agroatlas.ru/en/content/pests/Adoxophyes_orana/)
2. Anonymous. 2014. Summer Fruit Tortrix Moth. Massachusetts Introduced Pests Outreach Project. Accessed 3/2/2016.
  - <http://www.massnrc.org/pests/pestFAQsheets/summer%20fruit%20tortrix%20moth.htm>
3. Anonymous. 2015. *Adoxophyes orana* (summer fruit tortrix). Invasive Species Compendium. Accessed 2/29/2016.
  - <http://www.cabi.org/isc/datasheet/11253>
4. Anonymous. Summer fruit tortrix moth (*Adoxophyes orana* Fischer von Röslerstamm). AHDB Horticulture. Accessed 3/3/2016.
  - <http://apples.ahdb.org.uk/summer-fruit-tortrix-moth.asp>
5. Carroll, J. and K. Peterson. 2012. Summer Fruit Tortrix Moth *Adoxophyes orana*. New York State Integrated Pest Management Program. Accessed 2/29/2016.
  - [http://nysipm.cornell.edu/invasives\\_exotics/sftm/sftm.pdf](http://nysipm.cornell.edu/invasives_exotics/sftm/sftm.pdf)



**protect u.s.**

community invasive species network

First Detectors Protecting U.S. from Pests

# References

6. Davis, E.E., S. French, and R.C. Venette. 2005. Mini Risk Assessment Summer Fruit Tortrix Moth, *Adoxophyes orana* (Fischer von Röslerstamm, 1834) [Lepidoptera: Tortricidae]. Department of Entomology, University of Minnesota. Accessed 2/29/2016.  
– <https://extension.entm.purdue.edu/CAPS/pdf/datasheets/SummerFruitTortrixMoth.pdf>
7. Gilligan, T.M. and M.E. Epstein. *Adoxophyes orana*. Tortricids of Agricultural Importance. Accessed 3/1/2016.  
– [http://idtools.org/id/leps/tortai/Adoxophyes\\_orana.htm](http://idtools.org/id/leps/tortai/Adoxophyes_orana.htm)
8. Gilligan, T.M. and M.E. Epstein. *Argyrotaenia quadrifasciana*. Tortricids of Agricultural Importance. Accessed 3/3/2016.  
– [http://idtools.org/id/leps/tortai/Argyrotaenia\\_quadrifasciana.htm](http://idtools.org/id/leps/tortai/Argyrotaenia_quadrifasciana.htm)
9. Gilligan, T.M. and M.E. Epstein. *Argyrotaenia quercifoliata*. Tortricids of Agricultural Importance. Accessed 3/3/2016.  
– [http://idtools.org/id/leps/tortai/Argyrotaenia\\_quercifoliata.htm](http://idtools.org/id/leps/tortai/Argyrotaenia_quercifoliata.htm)





## References

10. Kamminga, K. and K. Maguylo. 2012. Summer Fruit Tortrix Moth (*Adoxophyes orana*). USDA New Pest Response Guidelines. Accessed 2/29/2016.
  - [https://www.aphis.usda.gov/import\\_export/plants/manuals/emergency/downloads/nprg-SummerFruitTortrixMoth.pdf](https://www.aphis.usda.gov/import_export/plants/manuals/emergency/downloads/nprg-SummerFruitTortrixMoth.pdf)
11. Lynette. 2005. Species *Cenopis reticulatana* - Reticulated Fruitworm - Hodges#3720. BugGuide. Accessed 3/3/2016.
  - <http://bugguide.net/node/view/22151>
12. Noma, T., M. Colunga-Garcia, M. Brewer, J. Landis, and A. Gooch. 2010. Summer fruit tortrix *Adoxophyes orana*. Michigan State University's Invasive Species Factsheets. Accessed 2/29/2016
  - [http://www.ipm.msu.edu/uploads/files/forecasting\\_invasion\\_risks/summerfruittortrix.pdf](http://www.ipm.msu.edu/uploads/files/forecasting_invasion_risks/summerfruittortrix.pdf)

