

ALIFORNIA DEPARTMENT OF

# **California Pest Rating Profile for**

# *Neonectria ditissima* (Tul. & C. Tul.) Samuels & Rossman European canker

## Pest Rating: C

Kingdom: Fungi, Phylum: Ascomycota, Subphylum: Pezizomycotina, Class: Sordariomycetes, Subclass: Hypocreomycetidae, Order: Hypocreales, Family Nectriaceae

# Comment Period: 02/24/2025 through 04/10/2025

#### **Initiating Event:**

This pathogen has not been through the pest rating process. The risk to California from *Neonectria ditissima* is described herein and a permanent rating is proposed.

#### **History & Status:**

**Background:** Species of *Neonectria* sensu lato and their anamorphs in *Cylindrocarpon* are common in tropical and temperate regions. Some species of this genus are plant pathogens causing cankers, root rots, and other diseases on hardwood and coniferous trees. *Neonectria* sensu stricto species are mostly found in temperate regions on woody substrata, e.g. bark, often causing cankers, and rarely found in soil. *Neonectria ditissima* and its anamorph, *Cylindrocarpon heteronemum*, are classified in *Neonectria* sensu stricto (Chaverri et al., 2011).

With the common name of "European canker", this pathogen and the diseases it causes are widespread around the world. It is an important pathogen of apples (*Malus domestica*) (Creemers, 2014). In California, it is known to commonly infect apple, California bay, dogwood, maple, and pear (French, 1989; CDFA PDR database, 2025).

Hosts: Acer circinatum (vine maple), A. macrophyllum (broadleaf maple), A. pensylvanicum (striped maple), A. rubrum (red maple), A. saccharum (sugar maple), A. spicatum (mountain maple), Aesculus (buckeye), Alnus incana (grey alder), Betula alleghaniensis (yellow birch), B. lenta (sweet birch), B. nigra (river birch), B. papyrifera (paper birch), B. pendula (common silver birch), B. populifolia (gray birch), Carpinus betulus (hornbeam), Carya cordiformis (bitternut hickory), C. glabra (pignut hickory), C.



*illinoinensis* (pecan), *C. ovata* (shagbark hickory), *C. tomentosa, Cornus nuttallii* (pacific dogwood), *Corylus avellana* (hazel), *Fagus grandifolia* (American beech), *F. sylvatica* (common beech), *Frangula alnus* (alder buckthorn), *Fraxinus excelsior* (ash), *F. nigra* (black ash), *Juglans cinerea* (butternut), *J. nigra* (black walnut), *Liriodendron tulipifera* (tuliptree), *Malus domestica* (apple), *Nyssa sylvatica* (tupelo), *Populus grandidentata* (bigtooth aspen), *P. tremuloides* (trembling aspen), *Prunus serotina* (black cherry), *Pyrus communis* (European pear), *P. pyrifolia* (oriental pear tree), *Quercus alba* (white oak), *Q. bicolor* (swamp white oak), *Q. coccinea* (scarlet oak), *Q. garryana* (Garry oak), *Q. laurifolia* (laurel oak), *Q. rubra* (northern red oak), *Q. velutina* (black oak), *Rhus typhina* (staghorn sumac), *Rosa* (roses), *Salix alba* (white willow), *S. amygdaloides* (peachleaf willow), *Sorbus aucuparia* (mountain ash), *Tilia americana* (basswood), *Ulmus americana* (American elm), *U. glabra* (mountain elm) (CABI, 2025).

*Symptoms*: *Neonectria* infections generally occur during fall, but symptoms do not become obvious until spring. Once infection takes place, the fungus slowly penetrates bark tissue. Plants are especially susceptible to infection when the bark is wounded and the plants are unhealthy or stressed, such as from recent transplanting. On apples, reddish-brown lesions appear on small branches just below leaf scars. Discolored, sunken, often elliptical cankers commonly develop in bark. These will elongate into cankers with concentric ridges. Infections are seen on trunks, branches, and twigs, which become girdled, ultimately leading to the death of all parts distal to the infection site. Calyx rot of fruits can occur in years when there is rain shortly before harvest. Pruning wound infections are seen occasionally (especially on the cultivar 'Delicious') (Gubler and Teviotdale, 2015).

Where fungal cankers occur, cutting away bark reveals a margin separating dead (dark brown, necrotic) and healthy (cream-colored) wood. The green, living cambial layer found just beneath healthy bark is absent where cankers occur (Weber, 2014)

*Transmission:* The fungus survives the summer as mycelia (vegetative fungal growth) in infected branch and shoot cankers. Two types of spore-producing bodies are produced: Ascospores in a perithecia from the perfect stage and macroconidia in sporodochia from the asexual stage. Sporodochia are produced in the fall. They appear as small, white tufts on the cankers after rain; these tufts persist through spring. The perithecia are small, red, spherical fruiting structures that occur on the surface of older cankers. These can be seen without magnification and are called 'coral spots'. In addition, *N. ditissima* can cause fruit rots of apples which become visible as a blossom-end rot during the growing season or as a storage rot after harvest (Weber, 2014).

Macroconidia are released by rainsplash and carried within small water droplets or by water run-off. Ascospores are either distributed by wind, following their explosive release from perithecia, or by rainsplash or run-off. Ascospores enable the fungus to undergo long-distance dispersal whereas both ascospores and conidia may spread the fungus within an infected tree or between adjacent trees.

The fungus survives in old bark cankers and produces spores that enter fresh leaf scars during fall rains. In years when leaf fall occurs over a long time, the incidence of European canker is greater the following spring. Trunk cankers developing on young trees within the first 1–3 seasons of planting can often be traced back to latent infections initiated in the nurseries (Weber, 2014; Weber and Børve,).



*Damage Potential:* Apple canker is particularly common in regions with a mild and humid climate (Weber and Børve, 2021). In California, European canker is generally a minor disease. Plants infected when young may die, but it rarely, if ever, kills older plants. Callus tissue developing around wounds often limits canker spread and prevents girdling of limbs or the trunk.

Diseased bark cracks, the edges may take on a papery appearance, and the bark can slough off. Cankered limbs are more susceptible to breakage. The main damage on apples and pear is that cankers reduce the fraction of fruiting wood on the tree, thereby reducing yield. Calyx rot of fruit can occur in years when rain precedes harvest, but in California, this is uncommon because fruit harvest is generally completed before the winter rainy season. The Delicious variety is most susceptible, followed by Gravenstein and Rome Beauty. This disease is worse in the Sebastopol area of Sonoma County in years with prolonged fall rains (Gubler and Teviotdale, 2015).

**Worldwide Distribution**: Asia: Afghanistan, India, Indonesia, Iran, Iraq, Japan, Lebanon, Saudi Arabia, South Korea, Syria, Taiwan. Europe: Austria, Belgium, Bulgaria, Denmark, Estonia, Faroe Islands, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Ukraine, United Kingdom. North America: Canada, Mexico, United States (California, Connecticut, Illinois, Indiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, New Hampshire, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, South Dakota, Vermont, Virginia, Washington, West Virginia). Oceania: Australia, New Zealand. South America: Argentina, Chile, Uruguay (CABI, 2025).

<u>Official Control</u>: Neonectria ditissima is on the EPPO's A1 list for Egypt and the A2 list for Brazil. It is a and is a quarantine pest in Israel and a regulated non-quarantine pest in Switzerland and the United Kingdom (EPPO, 2025). It is on the USDA PCIT's harmful organisms list for Brazil, Canada, Ecuador, Egypt, Guatemala, Honduras, Iceland, Israel, the Republic of Korea, Mozambique, Namibia, Peru, South Africa, and Taiwan (USDA-PCIT, 2025).

<u>California Distribution</u>: Widespread along the north coast especially on apples and occurring sporadically on the central coast and in southern California on apples, pears and other woody plants (French, 1989; CDFA PDR Database, 2025).

#### California Interceptions: none

The risk that *Neonectria ditissima* would pose to California is evaluated below.

## **Consequences of Introduction:**

1) Climate/Host Interaction: This pathogen causes more serious disease in mild areas with more humidity and rainfall.



Evaluate if the pest would have suitable hosts and climate to establish in California.

Score: 2

- Low (1) Not likely to establish in California; or likely to establish in very limited areas.
- Medium (2) may be able to be established in a larger but limited part of California.
- High (3) likely to establish a widespread distribution in California.
- 2) Known Pest Host Range: The host range includes plants in multiple families.

Evaluate the host range of the pest.

Score: 3

- Low (1) has a very limited host range.
- Medium (2) has a moderate host range.
- High (3) has a wide host range.
- **3) Pest Reproductive Potential:** This pathogen has multiple types of spores and spreads with rain and wind.

Evaluate the natural and artificial dispersal potential of the pest.

Score: 3

- Low (1) does not have high reproductive or dispersal potential.
- Medium (2) has either high reproductive or dispersal potential.
- High (3) has both high reproduction and dispersal potential.
- 4) Economic Impact: This is generally considered a minor disease for California but in areas with higher rainfall and for more susceptible varieties, there can be losses of branches and yield. It is a pest of regulatory concern for some trading partners.

Evaluate the economic impact of the pest on California using the criteria below.

## Economic Impact: A, C

- A. The pest could lower crop yield.
- B. The pest could lower crop value (including increasing crop production costs).
- C. The pest could trigger the loss of markets (including quarantines).
- D. The pest could negatively change normal cultural practices.
- E. The pest can vector, or is vectored, by another pestiferous organism.
- F. The organism is injurious or poisonous to agriculturally important animals.
- G. The organism can interfere with the delivery or supply of water for agricultural uses.

## Economic Impact Score: 2

- Low (1) causes 0 or 1 of these impacts.
- Medium (2) causes 2 of these impacts.
- High (3) causes 3 or more of these impacts.
- 5) Environmental Impact: This disease can affect home and urban gardening.



Evaluate the environmental impact of the pest on California using the criteria below.

#### **Environmental Impact: E**

- A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.
- B. The pest could directly affect threatened or endangered species.
- C. The pest could impact threatened or endangered species by disrupting critical habitats.
- D. The pest could trigger additional official or private treatment programs.
- E. The pest significantly impacts cultural practices, home/urban gardening, or ornamental plantings.

#### **Environmental Impact Score: 2**

- Low (1) causes none of the above to occur.
- Medium (2) causes one of the above to occur.
- High (3) causes two or more of the above to occur.

#### Consequences of Introduction to California for Neonectria ditissima: Medium

Add up the total score and include it here. **12** -Low = 5-8 points -Medium = 9-12 points -High = 13-15 points

6) Post-Entry Distribution and Survey Information: Evaluate the known distribution in California. Only official records identified by a taxonomic expert and supported by voucher specimens deposited in natural history collections should be considered. Pest incursions that have been eradicated, are under eradication or have been delimited with no further detections should not be included.

#### Evaluation is 'High'.

#### Score: -3

-Not established (0) Pest never detected in California or known only from incursions. -Low (-1) Pest has a localized distribution in California or is established in one suitable climate/host area (region).

-Medium (-2) Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.

-High (-3) Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.

7) The final score is the consequences of the introduction score minus the post-entry distribution and survey information score: (Score)

*Final Score:* Score of Consequences of Introduction – Score of Post Entry Distribution and Survey Information = 9



**Uncertainty:** 

None

## **Conclusion and Rating Justification:**

Based on the evidence provided above the proposed rating for Neonectria ditissima is C.

## **References:**

CABI Compendium. 2025. *Neonectria ditissima* (Nectria canker (apple, pear)) https://doi.org/10.1079/cabicompendium.35964.57034 Accessed 1/16/2025

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Creemers P. *Nectria* canker. In: Sutton, T.B., Aldwinckle, H.S., Agnello, A.M., Walgenbach, J.F., editors. Compendium of apple and pear diseases and pests. 2nd ed. St. Paul: APS; 2014. p. 49–51.

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French, A. M. 1989. California plant disease host index. California Department of Food and Agriculture, Division of Plant Industry, Sacramento.

Gubler, W. D. and Teviotdale, B. L. European Canker. 2015. UC IPM Pest Management Guidelines: Apple UC ANR Publication 3432.

USDA Phytosanitary Certificate Issuance and Tracking System, Phytosanitary Export Database (PExD) Harmful Organisms Database Report. *Neonectria ditissima* and *Nectria galligena* Accessed 1/16/2025.

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Weber, R.W. and Børve, J., 2021. Infection biology as the basis of integrated control of apple canker (*Neonectria ditissima*) in Northern Europe. CABI Agriculture and Bioscience, 2, pp.1-16.

# **Responsible Party:**



Heather J. Martin, Primary Plant Pathologist/Nematologist, CDFA/PHPPS ECOPERS, 1220 N St Rm 221, Sacramento, CA 95814 Phone: (916) 654-1017, permits[@]cdfa.ca.gov.

## \*Comment Period: 02/24/2025 through 04/10/2025

## \*NOTE:

You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at permits[@]cdfa.ca.gov.

## **Comment Format:**

 Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

#### **Example Comment:**

Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to "Climate/Host Interaction" here.]

- Posted comments will not be able to be viewed immediately.
- Comments may not be posted if they:

Contain inappropriate language which is not germane to the pest rating proposal;

Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;

Violates agency regulations prohibiting sexual harassment or other forms of discrimination;

Violates agency regulations prohibiting workplace violence, including threats.

- Comments may be edited prior to posting to ensure they are entirely germane.
- Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.

Pest Rating: C