CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Profile for

Ilyonectria capensis L. Lombard & Crous 2013

Pest Rating: C

Comment Period CLOSED: 2/21/2019 – 4/7/2019

Initiating Event:

On January 16, 2019, samples of young, rooted kiwi vines showing symptoms of root rot were collected from an orchard in Santa Cruz County by county agricultural staff and sent to the CDFA Plant Pathology Laboratory for diagnosis of the associated pathogen. On February 4, 2019, Suzanne Latham, CDFA Plant Pathologist, detected the fungal pathogen, *Ilyonectria capensis* from the roots. Two other pathogens, *Phytopythium vexans* and *Botryosphaeria dothidea*, were isolated from the roots and trunks, respectively. Since there is no earlier detection record of *I. capensis* in California, this pathogen was assigned a temporary Q rating. The other two pathogens are known to be widely distributed within the State. The risk of infestation of *Ilyonectria capensis* in California is assessed and a permanent rating is herein proposed.

History & Status:

Background: *Ilyonectria capensis* was first reported as a new species associated with black foot rot disease on roots of *Protea* sp. cuttings in a nursery near Stanford, Western Cape Province, South Africa. Six species in the genus *Ilyonectria* were found to be associated with the diseased roots, and in pathogenicity tests, all six species were individually capable of causing black foot rot disease in *Protea* cuttings and thereby, marked a first report of black foot rot disease associated with the cultivation of Proteaceae cut flowers (Lombard et al., 2013). Since its initial detection in South Africa, *I. capensis* has been recovered from roots of aleppo pine, juniper, and strawberry tree from forest-plant nurseries in Spain (Mora-Sala et al., 2018). In California, black foot rot disease has been found in grapevine in the cooler climates of the north coastal region. Its causal agents are included in several genera along with *Ilyonectria* (Agustí-Brisach and Armengol, 2013), but do not include *I. capensis*. In 2019, *I. capensis* was officially detected for the first time in California, USA (see: 'Initiating Event'). Furthermore, the pathogen was recently unofficially detected in peach roots of infested orchard trees in Fresno County (*pers. comm*.: S. Latham, CDFA).

Disease Cycle: There is very little information reported on the disease cycle and epidemiology of *I. capensis*. However, it is likely that this pathogen behaves similarly to the pathogens that cause black foot disease of grapevine. *Ilyonectria capensis* is a soilborne fungus that produces chlamydospores (thick-walled resting-stage asexual spores) which allow it to survive in soil for extended periods of time in the absence of a host. Pathogen-infested soil and potting media and infected planting material are a source of inoculum. The fungus can infect a host plant through natural openings or wounds on the roots or through the crown of a rootstock. Following the invasion of host tissue, root lesions develop, and xylem tissue is plugged by fungal tissue, gums, and tyloses. This results in reduction in nutrient and water uptake and subsequently, the plant declines (Petit, 2015).

Dispersal and Spread: *Ilyonectria capensis* is a soilborne fungus. Therefore, the movement of pathogen-infested soil, potting media, and planting materials provides a means for its spread to non-infected sites (Lombard et al., 2016). In addition, the fungus is probably spread in soil by moving water (Petit, 2015).

Hosts: Arbutus unedo (strawberry tree; Ericaceae), *Juniperus* sp. (juniper; Cupressaceae), *Pinus halepensis* (aleppo pine; Pinaceae), *Protea* sp. (protea; Proteaceae) (Farr and Rossman, 2018; Lombard et al., 2013; Mora-Sala et al., 2018), *Prunus persica* (peach: *pers. comm*. S. Latham).

Symptoms: Symptoms associated with *Ilyonectria* black foot rot disease include stem blackening, wilting and leaf blight. Internally, stems of infected plants reveal necrosis which progresses upward from the base of the plant (Lombard et al., 2013).

Damage Potential: Ilyonectria capensis can cause root rot, general decline and death of infected plants. Black foot rot disease caused by *I. capensis* can be a problem particularly in nursery production of host plants, where optimal environments favor pathogen development. Closely-spaced plants, regular irrigation and pruning practices, and heavy use of fertilizers provide a microclimate that is conducive for pathogen infection and development. Planting of infected, rooted Proteaceae cuttings in private and commercial non-infected lands could result in losses of mature plants. (Lombard et al., 2013; Mora-Sala, 2018). Losses due to *I. capensis* to mature aleppo pine, juniper and peach have not been reported.

Worldwide Distribution: *Europe*: Spain; *Africa*: South Africa; North America: USA (California) (Farr & Rossman, 2018; Lombard et al., 2013; Mora-Sala et al., 2018).

Official Control: None reported.

California Distribution: Santa Cruz County (*see* 'Initiating Event') and Fresno County (*pers. comm*.: S. Latham, CDFA).

California Interceptions: There have been no interceptions of plants infected with *Ilyonectria capensis* (see: 'Initiating Event').

The risk *Ilyonectria capensis* would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** *Ilyonectria capensis* has already been unofficially detected in commercial orchards of peach and kiwi, and has other suitable hosts (juniper and aleppo pine) that are commonly present in California. The pathogen is likely to establish in a larger but limited part of the State.

   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 establish in a larger but limited part of California.

- High (3) likely to establish a widespread distribution in California.

2) **Known Pest Host Range:** Presently, the host range of *I. capensis* is limited to a few plant species, although some are widely distributed within the State.

Evaluate the host range of the pest.
Score: 1
- Low (1) has a very limited host range.
- Medium (2) has a moderate host range.
- High (3) has a wide host range.

3) **Pest Dispersal Potential:** The pathogen is soilborne and can be spread through movements of soil and infested planting materials. It is given a medium rating in this category.

Evaluate the natural and artificial dispersal potential of the pest.
Score: 2
- 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:** *Ilyonectria capensis* can cause root rot, general decline, and death of infected plants. Black foot rot disease caused by *I. capensis* can be a problem particularly in nursery production of host plants, where optimal environments favor pathogen development.

Evaluate the economic impact of the pest to California using the criteria below.
Economic Impact: A, B, C, D, G
A. The pest could lower crop yield.
B. The pest could lower crop value (includes increasing crop production costs).
C. The pest could trigger the loss of markets (includes 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: **3**
- 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:** *Ilyonectria capensis* may impact home gardening or ornamental plantings. Losses to mature aleppo pine, juniper and peach have not been reported.

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 *Cucurbit chlorotic yellows virus:*

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

Total points obtained on evaluation of consequences of introduction to California = **10**

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. (Score)

Evaluation is Low. Presently, *I. capensis* has been detected in Santa Cruz and Fresno counties.

Score: (-1)
-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 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:

It is probable that *Ilyonectria capensis* has a wider distribution in California than is currently reported here but has not been detected until recently, due to the unavailability of specific molecular diagnostic tools. The full distribution of *I. capensis* within California is not known.

Conclusion and Rating Justification:

Based on the evidence provided above **the proposed rating for *Ilyonectria capensis* is C.**

References:

Agustí-Brisach,C., and Armengol, J. 2013. Black-foot disease of grapevine: an update on taxonomy, epidemiology and management strategies. Phytopathologia Mediterranea, 52:245-261.
Farr, D.F., & Rossman, A.Y. Fungal Databases, U.S. National Fungus Collections, ARS, USDA. Retrieved February 13, 2019, from https://nt.ars-grin.gov/fungaldatabases/
Lombard, L., Bezuidenhout, C. M., and Crous, P. W. Ilyonectria black foot rot associated with *Proteaceae*. Australasian Plant Pathology, 42:337-349.
Mora-Sala, B., Cabral, A., Léon, M., Agustí-Brisach, Armengol, J., and Abad-Campos, P. 2018. Survey, identification, and characterization of Cylindrocarpon-like asexual morphs in Spanish forest nurseries. Plant Disease, 102:2083-2100. https://doi.org/10.1094/PDIS-01-18-0171-RE
Petit, E. 2015. Black foot disease. *In* Compendium of Grape Diseases, Disorders, and Pests Second Edition. Edited by Wilcox, W. F., Gubler, W. D., and Uyemoto, J. K. The America Phytopathological Society, pg. 26-28.

Responsible Party:

John J. Chitambar, Primary Plant Pathologist/Nematologist, California Department of Food and Agriculture, 3294 Meadowview Road, Sacramento, CA 95832. Phone: 916-738-6693, plant.health[@]cdfa.ca.gov.

Comment Period CLOSED: 2/21/19 – 4/07/19

Pest Rating: C