

California Pest Rating Proposal for

Quinisulcius spp. Siddiqi 1971

Current Pest Rating: **D**

Proposed Pest Rating: **C**

Comment Period: **09/04/2019 through 10/19/2019**

Initiating Event:

During the 1950-60s, several species of plant parasitic nematodes were given a 'D' rating as they were regarded as parasites, predators, or organisms of little or no economic importance that did not require State-enforced regulatory action. However, these nematode species were inaccurately assigned a 'D' rating as most, if not all, are plant parasitic and therefore, capable of damaging plant production and causing significant economic losses especially at the county and local residential/grower level.

Furthermore, the detection of plant parasitic nematodes in nursery stock may be an indication of contamination in violation of the State's standard of pest cleanliness required for nurseries. Presently, all *Quinisulcius* spp. are rated 'D'. The risk posed by members of this genus is re-assessed here and a permanent rating is proposed.

History & Status:

Background: Generally, pest risk assessments and assignment of pest ratings are conducted *per* individual pest species and not *per* genus primarily due to differing pest biologies, geographical distributions, host ranges, damage potentials, and risk mitigating requirements. However, an exception to this rule is made here for the genus *Quinisulcius* largely because of historical practice. Over the past several decades, members of the genus *Quinisulcius* were seldom identified to species-level by CDFA Nematologists mainly due to 1) they are considered mild pathogens of plants, 2) the common occurrence and wide distribution within California, 2) no state-enforced regulatory action required subsequent to their detection, and 3) prioritizing diagnosis of nematode species in other genera considered to be of greater economic importance than those belonging to *Quinisulcius*.

Members of the genus *Quinisulcius* have the common name of "stunt nematodes". The key character to differentiate *Quinisulcius* from other common *Tylenchorhynchus* species is the five incisures in the lateral fields. *Quinisulcius* reproduce mainly by sexual reproduction (females produce oocytes, which

are fertilized by sperm from males). The fertilized females produced eggs. After hatching, these nematodes progress through three juvenile stages before becoming adults. *Quinisulcius* species usually inhabit the soil-root region of plants and feed as obligate migratory ectoparasites of roots using a stylet to feed on epidermal cells. All motile juvenile and adult stages feed (Mai et al., 1996; Maggenti, 1981). They are considered to be relatively cold-tolerant. At least one species, *Q. capitatus*, is able to survive and propagate at below-freezing temperatures (as low as -15°C) (Hussain et al., 2019).

Hosts: *Quinisulcius* spp. are associated with the roots of a range of plants including cotton (*Gossypium* spp.) (Zarina and Maqbool, 1992), grape (*Vitis* spp.) (Raski et al., 1973), horseradish (*Armoracia rusticana*) (Walters et al., 2014), pear (*Pyrus communis*) (Allen, 1955), potato (*Solanum tuberosum*) (Maqbool, 1982), tobacco (*Nicotiana tabacum*) (Saeed et al., 1986), sorghum (*Sorghum bicolor*) (Cuarezma-Teran et al., 1894), sugar cane (*Saccharum officinarum*) (Akhtar, 1962), tomato (*Solanum lycopersicum*), *Citrus* spp., fig (*Ficus carica*), barley (*Hordeum vulgare*), oat (*Avena sativa*), maize (*Zea mays*), melon (*Cucumis melo*), mango (*Mangifera indica*), and *Prunus* spp. (Maqbool, 1986; Hussain et al., 2019).

Symptoms: General plant damage associated with *Quinisulcius* spp. is in common with other types of stunt nematodes and includes stunting of the root system which is expressed aboveground by yellowing of foliage, stunted top growth, and sometimes wilt and defoliation (Maggenti, 1981).

Transmission: The main mode of long and short distance spread is through artificial movement of nematode-infested soil that may accompany roots of planting stock, cultivation tools and equipment. These nematodes can also be spread through movement of run-off and irrigation water. They are not seed-borne.

Damage Potential: Generally, *Quinisulcius* spp. are considered mild pathogens of plants and are common associates of plant roots. However, plant damage caused by high populations of stunt nematodes may be more significant in small-area plant productions and/or containerized crops in nursery, residential, and local situations than in large acreages and environments such as pastures, parks, and cultivated fields. Crop losses under field conditions are not often reported, however, under experimental conditions, reductions in root and plant growth have been demonstrated by certain species. Crop damage under field conditions may be difficult to assess as *Quinisulcius* spp. are often represented by more than one species in a given situation or are found with other nematode genera (Bafokuzara, 1996).

Worldwide Distribution: *Quinisulcius* spp. are distributed worldwide in cold as well as warm climates.

Official Control: none

California Distribution: *Quinisulcius* spp. have been detected from the following counties; Contra Costa, Lake, Merced, Placer, San Diego, San Bernardino, Santa Barbara, Stanislaus, Tehama, and Ventura.

California Interceptions: *Quinisulcius* spp. have been detected in plant and soil shipments from Florida, Oklahoma, and Texas intercepted in California.

The risk *Quinisulcius* spp. would pose to California is evaluated below.

Consequences of Introduction:

- 1) **Climate/Host Interaction:** *Quinisulcius* are able to tolerate a wide range of climates. They are probably able to become established over a large portion of the state.

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

Score: 3

- 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:** *Quinisulcius* spp. are known to be associated as root feeders of diverse plant species.

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 Dispersal Potential:** The main mode of long and short distance spread is through artificial movement of nematode-infested soil that may accompany roots of planting stock, cultivation tools and equipment. These nematodes can also be spread through movement of irrigation water.

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:** Generally, *Quinisulcius* spp. are considered mild pathogens of plants. However, under high population levels in residences, nurseries, and other small-area plantings, *Quinisulcius* spp. infections could result in lowered crop yield.

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

Economic Impact: A

- 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: 1

- **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:** The impact of *Quinisulcius* spp. on natural environments is most likely not significant as the species is already widespread without causing apparent detriment to ecological balances and processes.

Environmental Impact: None

- 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: 1

- **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 *Quinisulcius* spp. is Medium:

Add up the total score and include it here. **10**

-Low = 5-8 points

-Medium = 9-12 points

-High = 13-15 points

- 6) **Post Entry Distribution and Survey Information:** *Quinisulcius* spp. are widely distributed in California and are present in several contiguous and non-contiguous climate and where hosts are grown throughout the state.
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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 introduction score minus the post entry distribution and survey information score:

Final Score: Score of Consequences of Introduction – Score of Post Entry Distribution and Survey Information = 7

Uncertainty:

None.

Conclusion and Rating Justification:

Based on the evidence provided above **the proposed rating for *Quinisulcius* spp. is C.**

References:

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Responsible Party:

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***Comment Period: 09/04/2019 through 10/19/2019**

*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 [plant.health\[@\]cdfa.ca.gov](mailto:plant.health[@]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.

Proposed Pest Rating: C
