

California Pest Rating Proposal for *Criconemoides* (syn. *Criconemella* De Grisse and Loof 1965), Taylor 1936

Ring Nematodes:

Current Pest Rating: **D**

Proposed Pest Rating: **C**

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

Initiating Event:

During the 1950s and 1960s, many species of plant parasitic nematodes were given a 'D' rating as they were considered to be of little or no economic importance, and not justifying State enforced regulatory action. However, these nematode species were incorrectly 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. Among these nematodes originally rated D are the ring nematode species in the genus *Criconemoides* (syn. *Criconemella*) (Siddiqi, 2000). The risk of infestation and permanent rating of this genus are re-assessed here.

History & Status:

Background: Generally, pest risk assessments and assignment of pest ratings are conducted *per* individual pest species and not *per* genus group primarily due to differing characters of pest biology, geographical distributions, host ranges, damage potentials, and risk mitigating requirements. However, an exception to this rule is made here largely because of historical practice. Over the past several decades, the ring nematodes in the genus *Criconemoides* were seldom differentiated to species level by CDFA nematologists mainly due to i) the common occurrence and wide distribution of member species within California, ii) no state enforced regulatory action required subsequent to their detection, and iii) greater demands of time involved in diagnosing high risk and other nematode species considered to be of greater economic importance than those belonging to the genera of ring nematodes.

Multiple genera of nematodes in the family Criconematidae have the common name of “ring nematodes” due to the fact they have distinctive coarse rings (annulations) around their bodies. The preferred scientific name for the genus under review here is *Criconemoides*, and other scientific name now treated as synonyms of *Criconemoides* is *Criconemella* De Grisse and Loof 1965. In addition, closely related genera with the ring nematode common names include but not limited to: *Crossonemoides* Eroshenko, 1981; *Macroposthonia* de Man, 1880; *Madinema* Khan, Chawla and Saha, 1976; *Mesocriconema* Andrassy, 1965; *Neobakernema* Ebsary, 1981; *Seshadriella* Darekar and Khan 1981; and *Xenocriconemoides* De Grisse and Loof, 1965 (Siddiqi, 2000).

Symptoms: Ring nematodes feed ectoparasitically on root tips or along more mature roots. This feeding damage can cause a reduction of small feeder roots and there may be abnormal tufted growth of small roots. They do not enter the root but feed deep into root tissues using a long stout stylet. Population densities of ring nematode are highest in areas where roots are most abundant, within the top 18 inches of soil (UC IPM, 2016).

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, and any human activity that can move soils from infested to non-infested sites.

Damage Potential: Generally, ring nematodes are common associates of plants and are considered mild pathogens. However, plant damage caused by high populations of ring 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. Ring nematodes are associated with the roots of a wide range of plants including tobacco, cotton, oats, and corn as well as other agricultural crops, fruit trees, ornamentals, nursery stock, forest trees and shrubs, desert shrubs, grasses, and weeds. The host status of associated plants is not always known (Siddiqi et al., 1973). Crop losses under field conditions are not widely reported, however, reductions in root and plant growth have been demonstrated by certain species, e.g., *Criconemella* (= *Mesocriconema*) *xenoplax*. Crop damage under field conditions may be difficult to assess as ring nematodes. are often mixed with other genera and/or two or more types of nematode species occurring together.

Worldwide Distribution: Ring nematodes are widespread around the world (CABI, 2019; Siddiqi et al, 1973)

Official Control: Currently, *Criconemoides* are D rated pests in California (see ‘Initiating Event’). *Criconemella* are on the ‘Harmful Organism Lists” for Australia and the Republic of Nauru. *Criconemoides* are on the list for Indonesia and Timor-Leste.

California Distribution: *Criconemoides* spp. are wide spread in California agriculture, landscapes and forests (Siddiqi et al, 1973; French, 1989).

California Interceptions: *Criconemoides* spp. are frequently intercepted with incoming shipments of nursery plants.

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

Consequences of Introduction:

- 1) Climate/Host Interaction:** *Criconemoides* spp. are distributed worldwide in temperate and tropical climates and are already widespread within California.

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:** *Criconemoides* spp. are known to be associated with many diverse plant species, however, the host status of associated plants is not always known.

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:** The main mode of long and short distance spread is through artificial means, including movement of nematode-infested soil that can accompany roots of planting stock, cultivation tools and equipment. These nematodes can also be spread through movement of run-off and 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, *Criconemoides* spp. are considered mild pathogens of plants. However, under high population levels in residential, nurseries and other small-area plantings, infestations could result in lowered crop yield.

Economic Impact: A

- A. The pest could lower crop yield.**
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- 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 *Criconemoides* 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 *Criconemoides* spp. is Medium.

Add up the total score and include it here.

-Low = 5-8 points

-Medium = 9-12 points

-High = 13-15 points

- 6) **Post Entry Distribution and Survey Information:** Thousands of detections of ring nematodes have been made in California.

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 = 10-3= 7*

Uncertainty:

None

Conclusion and Rating Justification:

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

References:

CABI Invasive species compendium datasheet. 2018. *Criconemella*.

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Nyczepir, A. P; Reilly, C. C; Motsinger, R. E; Okie, W. R, 1988. Behavior, parasitism, morphology, and biochemistry of *Criconemella xenoplax* and *C. ornata* on peach. Journal of Nematology, 20(1):40-46.

Siddiqi, I. A., Sher, S. A. and French, A. M. 1973. Distribution of Plant Parasitic Nematodes in California. State of California Department of Food and Agriculture, Division of Plant Industry. 324p.

Siddiqi, M. R. Tylenchida parasites of plants and insects. 2nd edition. CABI publishing. 2000.

UC IPM Pest Management Guidelines, Grape Nematodes. 2016. <http://ipm.ucanr.edu/PMG/r302200111.html>. Accessed 7/26/19

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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.
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- ❖ Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.
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Proposed Pest Rating: C
