CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Proposal for

Pratylenchus loosi Loof, 1960

Tea lesion nematode

Current Pest Rating: Q

Proposed Pest Rating: A

Kingdom: Animalia, Phylum: Nematoda,
Class: Chromadorea, Order: Rhabditida,
Family: Pratylenchidae

Comment Period: 06/02/2025 through 07/17/2025

Initiating Event:

In February 2025, Santa Clara County Agricultural inspectors working in the high-risk pest exclusion program intercepted an uncertified shipment of *Camellia* sp. from China. A root sample was sent to CDFA's Plant Pest Diagnostics Center at Meadowview. State Nematologist Sergei Subbotin identified *Pratylenchus loosi*, the tea lesion nematode, from the sample and assigned it a Q-rating. This pathogen has not been through the pest rating process. The risk to California from *P. loosi* is described herein, and a permanent rating is proposed.

History & Status:

Background:

The root lesion nematodes of the genus *Pratylenchus* Filipjev, 1936 are migratory endoparasites of plant roots. They are considered among the most widespread and destructive genera of phytopathogenic nematodes of agricultural crops (Sasser and Freckman, 1987). *Pratylenchus loosi* is widely distributed in Asian countries, with tea plants (*Camellia sinensis*) as the main host (Amarasena et al., 2020). It has been reported from more than 60 plant species but reports from hosts other than camellia (*Camellia. sinensis)*, citrus (*Citrus* spp.), and banana (*Musa* spp.) should be viewed with some uncertainty due to the difficulty of identification relying on morphology, which can be variable (EFSA, 2024).

As a migratory endoparasite, this nematode can enter plant roots, feed, reproduce, and move freely within the tissue while spending its entire life cycle there. The species can also be found in the soil

around roots. Within the roots, feeding is confined to the root cortex. Like other *Pratylenchus* species, *P. loosi* has six life stages: egg, four juvenile stages, and adults. Reproduction requires both females and males, and males are common. First-stage juveniles develop within the egg, followed by a first molt to the second-stage juvenile, which hatches from the egg. Each stage develops into the next via a molt of its cuticle (outer body covering). All juvenile and adult stages are worm-shaped (vermiform). All post-hatch stages are motile and can infect plants. Generally, root lesion nematodes have a life cycle of 45-65 days, but the duration is affected by temperature and moisture. *Pratylenchus loosi* survives the winter in infected roots or soil as eggs, juveniles, or adults. During spring, when plants are growing, eggs hatch to commence the life cycle within roots or in the rhizosphere soil. Within the root, nematodes feed on cortical tissue, causing necrosis of cortical cells, cell breakdown, and formation of cavities. Necrosis is apparent as lesions that expand as the nematodes move lengthwise within the infected roots. Some nematodes may leave the root, enter the soil, and re-enter the root at a different site, causing a new infection (Chitambar et al., 2018).

Hosts: Abelmoschus esculentus (okra), *Acacia decurrens* (green wattle), *Aechmea fasciata* (bromeliad), *Alternanthera sessilis* (sessile joyweed), *Artemisia vulgaris* (mugwort), *Brassica oleracea* var. *capitata* (cabbage), *Camellia sinensis* (tea), *Cassia alata* (ringworm senna), *Catharanthus roseus* (Madagascar periwinkle), *Cestrum* (jessamine), *Cinnamomum camphora* (camphor laurel), *Citrus* spp., *Coffea* (coffee), *Convallaria, Crocus sativus* (saffron), *Cymbopogon citratus* (lemongrass), *Cyperus* (flatsedge), *Cyperus rotundus* (purple nutsedge), *Dioscorea* (yam), *Dioscorea rotundata, Diospyros kaki* (persimmon), *Dipteryx odorata* (tonka bean), *Fragaria ananassa* (strawberry), *Grevillea robusta* (silky oak), *Hibiscus rosa-sinensis* (Chinese rose), *Imperata cylindrica* (cogon grass), *Malus domestica* (apple), *Mangifera indica* (mango), *Musa x paradisiaca* (plantain), *Oplismenus compositus, Panicum hemitomon, Panicum repens* (torpedo grass), *Paspalum notatum* (Bahia grass), *Pisum sativum* (pea), *Poncirus trifoliata* (trifoliate orange), *Prunus avium* (sweet cherry), *Pyrus communis* (European pear), *Saccharum officinarum* (sugarcane), *Sesbania cannabina* (corkwood tree), *Solanum nigrum* (black nightshade), *Solanum tuberosum* (potato), *Sorghum bicolor* (sorghum), *Tagetes* (marigold), *Tecoma stans* (yellow bells), *Tephrosia* (hoary-pea), *Tithonia diversifolia* (Mexican sunflower), *Triticum aestivum* (wheat), *Vigna unguiculata* (cowpea), *and Zea mays* (corn) (CABI, 2025; CDFA PDR database, 2025).

Symptoms: Infected plants have roots with black lesions and fewer feeder roots, resulting in stunted root growth. Top growth may exhibit general symptoms of an impaired root system, including lack of vigor, dieback, chlorotic and small leaves, and reduction of yield. In general, root lesion infection results in plants exhibiting symptoms of chlorosis, wilting, and stunting. Infected roots show initial symptoms of small, water-soaked lesions that soon turn brown to black. Lesions are formed along the root axis and may coalesce laterally to girdle the roots, which are killed. Affected root tissue may slough off, leaving a severely reduced root system. Secondary infection by fungi and bacteria may further destroy the root system by causing rot and sloughing off of the root tissues. Plant yield is reduced, and in severe infections, plants may be killed (Chitambar et al., 2018).

Transmission: The largest risk for transmission is with infected host plants for planting. It can also be moved with contaminated growing media and plant debris, and with contaminated machinery and equipment. Irrigation or run-off water can also move nematodes (EPPO, 2025).

Damage Potential: Pratylenchus loosi attack debilitates not only the available feeder roots (inducing slow decline) but also damages the storage roots, thus limiting carbohydrate reserves (Gnanapragasam, 2002). This nematode is well recognized as a serious pest of tea plants. Typical field symptoms of damage caused by *P. loosi*, in both young and mature tea plants, include patches of plants showing stunted growth with sparse and yellowish foliage, because of the reduced nutrient uptake by the damaged root systems (Sivapalan, 1971). *Pratylenchus loosi* is a persistent in the soil, attacking roots of tea plants of all ages and is thus problematic in tea nurseries, new plantations, and mature tea fields. The damage of *P. loosi* to tea crops was estimated to be between 4% and 40% (Gnanapragasham and Mohotti, 2018).

Worldwide Distribution: Africa: *Kenya, Senegal*; Americas: *Brazil, Chile, Guadeloupe, United States* (Florida); Asia: *Bangladesh, China, India, Iran, Japan, South Korea, Sri Lanka, Taiwan, Türkiye*; and Oceania: *American Samoa, Australia, Cook Islands* (CABI, 2025).

Official Control*: Pratylenchus loosi* is on the EPPO's A1 list for Argentina (EPPO, 2025). It is also on the USDA PCIT's harmful organisms list for Colombia, Ecuador, Nicaragua, Peru, Thailand, and the Republic of Korea (USDA-PCIT, 2025).

California Distribution: none

California Interceptions: In 2006, *P. loosi* was intercepted on an incoming nursery shipment of bromeliads (*Aechmea fasciata*) from Florida. A second interception is described in the "initiating event".

The risk that *Pratylenchus loosi* would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** *Pratylenchus loosi* occurs in tropical, subtropical, and warm temperate areas of the world. In California, suitable areas for establishment occur in the Central Valley and Southern California.

   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:** This is a polyphagous species capable of parasitizing hosts 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 nematode has a high reproductive potential, with a single female capable of producing hundreds of eggs. The natural dispersal is limited to 1-2m per year, but artificial dispersal with nursery stock has moved it across continents.

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:** Given the generally polyphagous nature of the genus *Pratylenchus*, impacts can be expected on various hosts.

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

Economic Impact: A,C, G

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: **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:** Camellias are widely planted as ornamentals in California.

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 *Pratylenchus loosi:* High

Add up the total score and include it here. **13**
-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 'Not established'.

Score: 0
-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* ***= 13***

Uncertainty:

None

Conclusion and Rating Justification:

Based on the evidence provided above the proposed rating for ***Pratylenchus loosi*** **is A.**

References:

Amarasena, P. G., Mohotti, K. M., De Costa, D. M., and Fosu-Nyarko, J. 2020. Morphometric and molecular characterization of isolates of the root lesion nematode, *Pratylenchus loosi* infecting tea in Sri Lanka. Tropical Agricultural Research, 31(1), 57–71.

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Responsible Party:

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***Comment Period: 06/02/2025 through 07/17/2025**

***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.

Proposed Pest Rating: A
