

California Pest Rating Profile for
***Pratylenchus flakkensis* Steinhorst, 1968**

Root-lesion nematode

Pest Rating: A

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

Comment Period: 08/26/2026 through 10/10/2026

Initiating Event:

This nematode does not currently have a California pest rating. This proposal evaluates the risk of *Pratylenchus flakkensis* to California and proposes a permanent rating.

History & Status:

Background:

The genus *Pratylenchus* is one of the most economically important groups of plant-parasitic nematodes. The name “lesion nematode” describes the darkened, necrotic lesions or patches that form on plant roots because of the damage caused by nematode feeding. *Pratylenchus* sp. are migratory endoparasites, meaning they enter the root cortical tissues, rhizomes, and tubers and feed as they tunnel. The cortical cell walls of the roots break down, and cavities form in the root cortex. Damaged roots are often subject to serious attacks from secondary fungal and bacterial plant pathogens. Plants with root damage from lesion nematodes suffer reduced absorption of water and nutrients, making the plants stunted and chlorotic. They grow poorly, have reduced yields, and may die. Root-lesion nematodes are migratory endoparasites. Juveniles and adults enter roots, feed within the cortex, move through root tissue, and may leave roots to move through soil to new feeding sites (Castillo and Vovlas, 2007).

Pratylenchus sp. have six life stages: egg, four juvenile stages, and adult. Reproduction can occur parthenogenically, with only females, and males are usually rare. First-stage juveniles develop within the egg, followed by a first molt to the second-stage juvenile that hatches from the egg. Each stage develops into the next via a molt of its cuticle (outer body covering). The juvenile and adult stages are worm-shaped (vermiform). All stages other than egg 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* sp. survive the winter in infected roots or soil as eggs, juveniles, or adults. During spring, when plant growth is active, eggs hatch to commence the life cycle within roots or in rhizosphere soil (Agrios, 2005; Chitambar et al., 2018).

Castillo and Vovlas (2007) described *Pratylenchus* species as major constraints of important crops including cereals, corn, legumes, potato, banana, coffee, peanut, and many fruit crops. *Pratylenchus flakkensis* is much less studied than some other damaging species such as *P. penetrans*, *P. thornei*, *P. neglectus*, *P. vulnus*, and *P. zaeae*.

Pratylenchus flakkensis was described by Seinhorst from pasture soil near Middelharnis on the island of Flakkee in the Netherlands. Additional paratypes were reported from Ouddorp in the Netherlands and Beckenham, England (Seinhorst, 1968). Available information indicates that *P. flakkensis* is associated with crop and grass hosts, but species-specific pathogenicity and yield-loss data are limited (Castillo and Vovlas, 2007).

Pratylenchus species can be difficult to identify because many species have overlapping morphology and because public molecular databases may include misidentified sequences. Subbotin et al. (2008) developed a phylogenetic framework for *Pratylenchus* using partial 18S rRNA and D2-D3 expansion segments of 28S rRNA and showed that molecular phylogenies were generally congruent with several morphological character groups. Janssen et al. (2017) emphasized the importance of linking molecular data to accurately identified voucher or topotype material and provided DNA sequences for *P. flakkensis* from topotype material.

A recent California study of *Pratylenchus* diversity used morphology, morphometrics, and molecular markers, including 18S rRNA, D2-D3 of 28S rRNA, and COI gene sequences, to characterize California *Pratylenchus* species and did not report any detections of *P. flakkensis* from California (Álvarez-Ortega et al., 2026) and there are no historical records (CDFA PDR Database, 2026; Nemaplex, 2010; Chitambar et al., 2018).

Pratylenchus flakkensis would pose risk primarily through movement of infested soil, rooted plants, nursery stock, turf, and contaminated equipment. Reported host or associated host groups include corn, sweet potato, fruit trees, turf grass, pasture vegetation, and grasses, several of which are relevant to California agriculture and managed landscapes (Castillo and Vovlas, 2007; Yu, 2008). The greatest uncertainty is whether *P. flakkensis* causes economically significant damage under California conditions, because species-specific pathogenicity and yield-loss data are limited.

Hosts: Reported hosts or associated plants of *P. flakkensis* include corn, sweet potato, fruit trees, and grasses (Castillo and Vovlas, 2007). The type locality was pasture soil, indicating an association with

pasture vegetation at the time of the original collection (Seinhorst, 1968). A Canadian survey reported *P. flakkensis* from turf grass in Ontario and Saskatchewan (Yu, 2008). A North American corn-associated record from Iowa was noted by Ozbayrak et al. (2019), who cited Norton (1983) and reported that GenBank contained two partial COI sequences identified as *P. flakkensis*.

These host records should be interpreted cautiously. Some are plant association records from soil or roots and may not demonstrate reproduction, pathogenicity, or economic damage on the named host. For this rating, the records of corn, sweet potato, fruit trees, turf grass, pasture plants, and grasses as hosts are treated as reported hosts or associated hosts and are not considered conclusive evidence of this nematode damaging these plants.

Symptoms: No distinctive aboveground symptoms specific to *Pratylenchus flakkensis* were found in the sources reviewed. Root-lesion nematodes as a group cause root lesions, cortical necrosis, root browning, reduced root growth, and impaired root function as they feed and migrate within roots. Aboveground symptoms are typically nonspecific and may include reduced vigor, stunting, chlorosis, wilting, uneven growth, and reduced yield when root damage is severe (Castillo and Vovlas, 2007).

Transmission: *Pratylenchus flakkensis* is expected to move by the same pathways as other root-lesion nematodes: infested soil, infected roots, rooted plants for planting, nursery stock, soil-contaminated equipment, and other articles that move soil or root material. *Pratylenchus* species are migratory endoparasites, and juveniles and adults can move between roots and soil during their life cycle (Castillo and Vovlas, 2007). No insect vector is known for this nematode, and it is not a virus vector to plants.

Damage Potential: Species-specific damage data for *Pratylenchus flakkensis* is limited. The main concern regarding damage is its biology as a root-lesion nematode and its reported association with crop and grass hosts (Castillo and Vovlas, 2007; Yu, 2008; Ozbayrak et al., 2019). Root-lesion nematodes can damage plants by feeding within roots, producing cortical lesions and necrosis, reducing root function, and predisposing injured roots to secondary infection (Castillo and Vovlas, 2007; Chitambar et al., 2018).

The direct economic impact of *P. flakkensis* is uncertain because available sources do not provide strong species-specific yield-loss data. If introduced into California crop, turf, pasture, orchard, or nursery systems, potential impacts could include reduced plant vigor, root damage, increased management costs, and nursery cleanliness concerns. These impacts are partly inferred from genus-level biology and should be treated as uncertain for *P. flakkensis* specifically.

Worldwide Distribution: *Pratylenchus flakkensis* was described from the Netherlands and England (Seinhorst, 1968). Yu (2008) reported *P. flakkensis* from Canada. Ozbayrak et al. (2019) noted that *P. flakkensis* had previously been reported from corn in Iowa by Norton (1983), but their Great Plains COI barcoding survey did not recover a matching *P. flakkensis* sequence. Additional country records have been summarized in later compilations, but some of those records are older, secondary, or not linked to voucher material or molecular confirmation. Because *Pratylenchus* species can be difficult to identify and molecular databases may include misidentified sequences, older or secondary distribution records

should be treated cautiously unless supported by adequate morphology, voucher material, or sequence data linked to reliable identifications (Janssen et al., 2017).

Official Control: *Pratylenchus flakkensis* is on the USDA PCIT's Harmful Organisms list for Venezuela (USDA PCIT, 2026).

California Distribution: none

California Interceptions: none

The risk that *P. flakkensis* would pose to California is evaluated below:

Consequences of Introduction:

- 1) Climate/Host Interaction:** *Pratylenchus flakkensis* has been reported from temperate regions, including the Netherlands, England, and Canada (Seinhorst, 1968; Yu, 2008). Reported hosts or associated hosts include corn, sweet potato, fruit trees, turf grass, pasture vegetation, and grasses, which include host groups present in California agricultural and nursery systems (Castillo and Vovlas, 2007; Yu, 2008).

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:** Reported host or associated host groups include corn, sweet potato, fruit trees, turf grass, pasture vegetation, and grasses (Seinhorst, 1968; Castillo and Vovlas, 2007; Yu 2008; Ozbayrak et al., 2019). Some records may represent associations rather than confirmed damaging host relationships. However, the reported host information spans several plant 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:** Root-lesion nematodes are migratory endoparasites that reproduce in roots or soil and move between soil and roots during their life cycle (Castillo and Vovlas, 2007). *Pratylenchus flakkensis* could be moved long distances in infested soil or water, rooted plants, nursery stock, turf, and contaminated equipment.

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:** Species-specific crop loss data for *Pratylenchus flakkensis* were not found in the literature. However, *Pratylenchus* species are economically important root parasites, and their feeding can cause cortical lesions, necrosis, reduced root function, and predisposition to secondary infection (Castillo and Vovlas, 2007).

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

Economic Impact: A, B, 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:** No strong evidence was found that *Pratylenchus flakkensis* would cause major environmental impacts in California. Reported associations with grasses, turf, pasture vegetation, and fruit trees suggest possible effects, but no reviewed evidence indicates significant impacts to rare plants, native ecosystems, or restoration programs. It could affect cultural practices and home/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 *Pratylenchus flakkensis*: 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.

Pratylenchus flakkensis is not known to be in California.

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:

Distribution and identification records should be treated carefully. The original European records are anchored by Seinhorst (1968), and molecular linkage to topotype material was later provided by Janssen et al. (2017). Subbotin et al. (2008) showed the value of ribosomal DNA phylogenetic data for resolving major clades and morphology-linked groupings within *Pratylenchus*, but species-level records still depend on reliable identifications. Other distribution records are weaker if they lack vouchers, morphology, or molecular confirmation.

Conclusion and Rating Justification:

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

References:

- Agrios, G. N. 2005. Plant Pathology, 5th Edition. Elsevier Academic Press. 922 pg
- Álvarez-Ortega, S., Subbotin, S.A., Chitambar, J.J., Stanley, J.D., Inserra, R.N. and Mundo-Ocampo, M. 2026. Diversity of plant-parasitic nematodes of the genus *Pratylenchus* (Nematoda: Pratylenchidae) in California: descriptions of two new species and insights from phylogenetic analyses. *Diversity* 18(1), 45.
- Castillo, P. and Vovlas, N. 2007. *Pratylenchus* (Nematoda: Pratylenchidae): diagnosis, biology, pathogenicity and management. *Nematology Monographs and Perspectives* 6. Brill, Leiden, The Netherlands.
- Chitambar, J. J., Westerdahl, B. B., and Subbotin, S. A. 2018. Plant Parasitic Nematodes in California Agriculture. In Subbotin, S., Chitambar J. (eds) *Plant Parasitic Nematodes in Sustainable Agriculture of North America. Sustainability in Plant and Crop Protection*. Springer, Cham.
- Janssen, T., Karssen, G., Couvreur, M., Waeyenberge, L. and Bert, W. 2017. The pitfalls of molecular species identification: a case study within the genus *Pratylenchus* (Nematoda: Pratylenchidae). *Nematology* 19(10), 1179-1199.
- Nemaplex. 2026. *Pratylenchus flakkensis*. University of California, Davis. <http://nemaplex.ucdavis.edu/> Accessed 7/8/2026
- Norton, D.C., 1983. Maize nematode problems. *Plant Disease*, 67(3), pp.253-256.
- Ozbayrak, M., Todd, T., Harris, T., Higgins, R., Powers, K., Mullin, P., Sutton, L. and Powers, T. 2019. A COI DNA barcoding survey of *Pratylenchus* species in the Great Plains Region of North America. *Journal of Nematology* 51, 1-16.
- Seinhorst, J.W. 1968. Three new *Pratylenchus* species with a discussion of the structure of the cephalic framework and of the spermatheca in this genus. *Nematologica* 14, 497-510.
- Subbotin, S.A., Ragsdale, E.J., Mullens, T., Roberts, P.A., Mundo-Ocampo, M. and Baldwin, J.G. 2008. A phylogenetic framework for root lesion nematodes of the genus *Pratylenchus* (Nematoda): evidence from 18S and D2-D3 expansion segments of 28S ribosomal RNA genes and morphological characters. *Molecular Phylogenetics and Evolution* 48, 491-505.
- USDA Phytosanitary Certificate Issuance and Tracking System, Phytosanitary Export Database (PEXD) Harmful Organisms Database Report. *Pratylenchus flakkensis*. Accessed 7/8/2026.
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Yu, Q. 2008. Species of *Pratylenchus* (Nematoda: Pratylenchidae) in Canada. Canadian Journal of Plant Pathology 30, 575-584.

Responsible Party:

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***Comment Period: 08/26/2026 through 10/10/2026**

*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](mailto: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: A
