CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

California Pest Rating Profile for

Rathayibacter tritici

(Carlson and Vidaver 1982 ex Hutchinson 1917) Zgurskaya et al. 1993

Head blight of wheat/tundu disease

Pest Rating: B

Domain: Bacteria, Phylum: Actinobacteria,
Class: Actinobacteria, Subclass: Actinobacteridae,
Order: Actinomycetales, Suborder: Micrococcineae,
Family: Microbacteriaceae

Comment Period: 07/16/2026 through 08/30/2026

Initiating Event:

This pathogen has not been through the pest rating process. It is an important pathogen for export seed certification of barley and wheat. The risk to California from *Rathayibacter tritici* is described herein, and a permanent rating is proposed.

History & Status:

Background:

Gram-positive aerobic coryneform bacteria with 2,4-diaminobutyric acid (DAB) in their cell walls were placed in the genus *Corynebacterium* by Lehmann and Neumann in 1896. However, there was great heterogeneity of strains in the genus, so Davis et al. 1984 transferred some strains to the genus *Clavibacter* based on biochemical characteristics of their cell walls. This included pathogens of grasses, moving them to become *Clavibacter tritici*. Subsequently, DNA-DNA and DNA-rRNA reassociation data did not clearly establish *Clavibacter* as a monophyletic genus. A new genus, *Rathayibacter*, was proposed to accommodate some species of gram-positive, aerobic, coryneform bacteria that attack plants and animals. Zgurskaya et al. (1993) described *Rathayibacter tritici* comb. nov. as a pathogen of annual grasses.

Rathayibacter is unusual among phytopathogenic bacteria in that it is transmitted by anguinid seed gall nematodes and produces extracellular polysaccharides. Common names for the disease include yellow

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slime, bacterial head blight and tundu disease. Disease expression depends on the close biological association between the bacterium and the wheat seed gall nematode, *Anguina tritici*, which produces seed galls and facilitates bacterial entry and spread in the host inflorescence (Gupta and Swarup, 1972; Paruthi and Bhatti, 1985; Park et al., 2017; Murray et al., 2017).

Rathayibacter tritici was first described as causing head blight of wheat in India (Hutchinson, 1917). A bacterial ooze is formed on the surface of the leaves and grains of affected plants. Seed transmission is limited, and the pathogen can be eliminated from seed lots by the removal of the nematode galls. *Rathayibacter tritici* is not known to be present in the United States and is considered a significant threat to wheat production; it is regulated domestically as a quarantine pest. *Anguina tritici* is also a regulated pest (Randhawa and Chitambar, 2017).

Hosts: Alopecurus sp. (foxtail), *Hordeum vulgare* (barley), *Lolium temulentum* (darnel), *Triticum aestivum* (wheat), *Triticum dicoccum*, and *Triticum turgidum* (durum wheat) (CABI, 2026).

Symptoms: Spike blight or tundu disease affects wheat and barley heads. EPPO lists bacterial ear rot of wheat, gumming disease of wheat, and yellow slime of wheat as common names for *R. tritici* (EPPO, 2026). In wheat, *R. tritici* produces an oozing bacterial infection of grain known as tundu disease, spike blight, or yellow ear rot. Because the disease complex involves both the bacterium and the nematode, disease expression may include symptoms of seed gall nematode infestation as well as bacterial exudation from infected wheat heads (Randhawa and Chitambar, 2017).

Transmission: The principal pathway for *R. tritici* is the movement of seed lots contaminated with *A. tritici* seed galls carrying the bacterium. ASTA states that wheat and barley seed are not direct pathways for *R. tritici* because the bacterium is carried in *A. tritici* galls and not directly in or on the seed. Therefore, *R. tritici* should be treated as a nematode-gall-associated bacterial pathogen rather than as a conventional, independently seedborne bacterial pathogen.

Little is known about the relationships between the *Rathayibacter* sp. and anguinid nematodes. These relationships should not be considered mutually beneficial since bacteria do not always remain viable in nematode galls. Infective juvenile nematodes carry bacteria on their cuticle in a film of water from galls resting on the soil surface to the growing points of a nearby young plant. The juvenile nematode enters developing ovules, where they induce seed gall formation. The bacteria later colonize. Experiments and observations suggest that the bacteria cannot invade plants in the absence of nematodes, but the advantages of the bacteria to the nematodes are not evident; in fact, they may be a negative. Juvenile nematodes with attached bacteria moved significantly slower than nematodes without attached bacteria and thus have a lower chance of successfully invading a plant (Bird and Riddle 1984). Anguinid nematodes associated with these bacteria form seed galls in infected plants and are capable of surviving for very long periods of time under dry conditions (Murray et al., 2025).

Damage Potential: Rathayibacter tritici has documented damage potential in wheat and barley, causing tundu disease. The bacterium produces conspicuous yellow bacterial ooze on infected spikes; infected heads may be distorted, slimy, sterile, or partially converted to diseased galls rather than marketable grain. Park et al. (2017) summarized *R. tritici* as the cause of spike blight in wheat and

barley and noted that diseases caused by *R. tritici* have resulted in economic losses in several countries, including Australia, China, Cyprus, Iran, and Pakistan.

Where the nematode-bacterium disease complex occurs, damage can exceed the direct galling injury caused by *A. tritici* alone because the bacterium converts the ear-cockle disease complex into yellow ear rot/tundu disease. Park et al. (2017) cited Fattah (1988) for the observation that intact nematode seed galls showed the greatest grain loss when *R. tritici* developed, supporting the conclusion that the bacterium can increase losses in already nematode-infested heads. The damage potential should therefore be described as potentially significant if introduced with viable *A. tritici* galls into susceptible cereal production but limited by dependence on the nematode vector/gall pathway and by the absence of evidence that *R. tritici* alone is seedborne or broadly host-adapted.

Worldwide Distribution: Africa: *Egypt, Ethiopia, Morocco, Zambia*. Asia: *Afghanistan, China, India, Iraq, Iran, Pakistan*. Europe: *Cyprus*. Oceania: *Australia* (EPPO, 2026)

Official Control*: Rathayibacter tritici* is on the EPPO's A1 list for the Eurasian Economic Union, Georgia, Kazakhstan, and Uzbekistan, and is a regulated quarantine pest in Moldova, Tunisia, and the United States (EPPO, 2026). It is on the USDA PCIT's harmful organisms list for Argentina, Colombia, Ecuador Eurasian Customs Union, Guatemala, New Zealand, and Venezuela (USDA-PCIT, 2026).

California Distribution: none

California Interceptions: none

The risk that *Rathayibacter tritici* would pose to California is evaluated below.

Consequences of Introduction:

1) **Climate/Host Interaction:** Evaluate if the pest would have suitable hosts and climate to establish in California. Wheat and barley are grown in California, primarily grown in the Sacramento Valley, San Joaquin Valley, Central Valley, and Imperial County. If *R. tritici* were introduced together with viable *A. tritici* galls, susceptible hosts and suitable production areas would be present.

   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:** The host range is limited to a few genera in the family Poaceae.

   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 Reproductive Potential:** The bacterium's dispersal potential is closely tied to the movement of *Anguina tritici* seed galls. Long-distance spread is most likely through contaminated seed lots containing nematode galls carrying *R*. *tritici*. The bacterium is not directly in or on seed, and removal of nematode galls prevents spread (ASTA, 2023).

   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:** Introduction of *R. tritici* could lower crop yield, lower crop value, increase seed cleaning and certification costs, and affect market access for wheat or barley seed lots. The disease is also of regulatory significance because it is a US quarantine pest. Economic risk overlaps with the regulatory risk of *A. tritici*, because the bacterium is carried in nematode galls and disease development is linked to that pestiferous organism.

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

   Economic Impact: A, B, C, E
   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: T**he known impacts of *R. tritici* are primarily agricultural and regulatory. There is no evidence in the sources reviewed that *R. tritici* would directly affect California natural ecosystems, threatened or endangered species, or non-agricultural plant communities. Official action or additional regulatory measures could be triggered if the pathogen were detected because of its phytosanitary significance and association with *A. tritici*, but evidence for environmental impact is otherwise limited.

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

Environmental Impact: D

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 *Rathayibacter tritici:* 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**: 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 is 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 consequence 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* ***= 10***

Uncertainty:

There is uncertainty about the extent to which *R. tritici* could persist or cause disease in California without established *A. tritici.* The sources reviewed support treating the nematode gall pathway as central to the biology and phytosanitary risk of *R. tritici* (Park et al., 2017).

Conclusion and Rating Justification:

Based on the evidence provided above, the proposed rating for ***Rathayibacter tritici*** **is B.**

References:

American Seed Trade Association. 2023. *Rathayibacter tritici*. ASTA Pest Database for Seeds.

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Responsible Party:

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***Comment Period: 07/16/2026 through 08/30/2026**

***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.

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: B