

California Pest Rating Proposal for
***Septocyta ruborum* (Lib.) Petrak. 1967**
(*syn. Rhabdospora ramealis* (Roberge ex Desm.) Sacc.)

Current Pest Rating: Q

Proposed Pest Rating: C

Comment Period: 7/24/2019 through 9/7/2019

Initiating Event:

On May 9, 2019, Sacramento County agricultural officials submitted a sample of boysenberry (*Rubus ursinus* x *Rubus idaeus*) from a commercial berry grower in Rio Linda, California, to the CDFA Plant Pathology lab. The sample showed symptoms of dieback and sporulating stem cankers. On June 7, 2019, CDFA plant pathologist Suzanne Latham identified the pathogen *Septocyta ruborum*, by morphology, and gave it a temporary Q rating. This was the first detection of this pathogen in California. The risk of infestation of *S. ruborum* in California is evaluated and a permanent rating is herein proposed.

History & Status:

Background: Purple blotch, caused by the fungal pathogen *Septocyta ruborum*, is a serious disease of *Rubus* spp. in the Pacific Northwest and in Europe on wild and cultivated species of blackberries and hybrid berries, and occasionally on raspberries, boysenberries, and loganberries. The disease affects the stems and lateral shoots. The symptoms are like those caused by a closely related pathogen, *Septoria rubi*, which causes leaf and cane spots, but differ in that *Septocyta rubrum* does not cause any leaf spotting. Spores of *S. ruborum* are produced in spring from cankers on floricanes (second-year fruit bearing canes) and infect only primocanes (new season canes) that will flower and fruit the following year.

First recognized in France, early research in Switzerland reported crop losses of 80% caused by purple blotch disease (Koellreuter, 1950). There are also reports of significant yield losses in the Netherlands and southeastern England (Oort, 1952; Punithalingam, 1980). In Australia, *S. ruborum* is a potential

biocontrol agent against the European blackberry which has become naturalized (Adair et al., 2012). In the Pacific Northwest (Oregon and Washington), the disease is serious and managed with fungicides, trellising, and an alternate-year cropping system that reduces inoculum (Pscheidt and Ocamb, 2019; WSU IPM, 2019).

Septocytia ruborum has no known teleomorph (sexual state) and has numerous synonyms including *Ascochyta ruborum*, *Rhabdospora ramealis*, *R. rubi*, *R. ruborum*, *Septocytia ramealis*, *Septoria ramealis*, and *S. ruborum* (CABI CPC datasheet, 2018).

Hosts: *Rubus* spp. including *R. laciniatus* (evergreen blackberry) (Foister, 1963), *R. leucodermis* (blackcap raspberry) (Shaw, 1973), *R. thyrsoides* (Gonzalez Fragoso, 1916), *R. fruiticosus* (shrubby blackberry) (Quaedvliet et al., 2013), *R. caesius* (dewberry) (Melnick and Popushoi, 1992; Vanev et al., 1997), *R. idaeus* (raspberry) (Mulencko et al., 2008), and *R. loganobaccus* (loganberry) (Karacic et al., 2011).

Symptoms: *Septocytia ruborum* causes dark green irregularly shaped lesions that form on canes of susceptible *Rubus* spp. late in the growing season. During winter and spring, lesions may become brown or purple with a red margin, giving the disease its common name of “purple blotch”. Numerous small black pycnidia develop in the center of the mature cane lesions. In early spring, under rain and high humidity, strands of conidia, in white mucilage up to 1 mm, are extruded from the pycnidia and are visible to the naked eye (Martin et al., 2015). The fungus infects plants by penetrating stomata, stem wounds, and possibly crevices associated with hair bases. Invasion of vascular bundles by hyphae disrupts internal transportation processes and appears to be the main mechanism for stem decline (Baguant, 2008). Affected areas 1 to 4 cm long develop into tan colored cankers and can girdle canes. In severe cases under highly favorable conditions, the cankers can merge and may completely cover stem internodes up to 2.5-3 m from the crown (Pscheidt and Ocamb, 2019). Axillary buds in infected portions of canes may begin to grow normally in the spring, but later the buds and leaves stop developing and die. Symptoms can be severe with entire shoots desiccating and dying back to the crown (Martin et al., 2015).

Transmission: *Septocytia ruborum* overwinters on infected canes. Spores are released from the cankers on floricanes and spread to newly growing primocanes from April to mid-August. Most spores are released from the pycnidia when temperatures are near 22°C and the peak month for spore release is June. The optimum temperature for germination of spores is 21-24°C with a minimum 0°C and a maximum 30°C. There is a relatively long period of 2- 8 months between spore infection and symptom development. Since the disease is undetectable as latent infections during this time that can stretch into until the following spring, it is difficult to recognize and eliminate cankers with fall pruning (Arsenijevic, 1989).

Spores are dispersed by splashing water. Overhead sprinklers or rain can spread spores between infected plants and within blocks of nursery stock; conditions for infection are favored by poor air circulation. Trellising canes by early September can reduce winter injury, which reduces disease. Using an alternate-year fruiting program, where canes are reduced in numbers and trained up as they grow,

can greatly reduce overwintering cankers, as does pruning out and destroy old wood before winter rains. (Pscheidt and Ocamb, 2019).

Damage Potential: In California, caneberries, including blackberries, can tolerate a wide range of climatic conditions from the extreme heat of the Central Valley to the wet, cool conditions along the North Coast. They are widely planted for commercial and backyard berry production and have naturalized in many areas. Blackberries are the most susceptible to *S. ruborum* infection, but cultivars differ in their susceptibility. Boysenberries and loganberries are less susceptible than blackberries (Pscheidt and Ocamb, 2019). In wetter areas of Washington and Oregon, purple blotch can cause severe crop loss and a rigorous fungicide regime is required to control it as cankers can reduce plant vigor and yield. If canes are left lying on the ground, the disease can be severe (USDA NIPMD). In the United Kingdom and Europe, *S. ruborum* frequently occurs in blackberry and is reported to causes crop losses up to 80% (Alford, 2008; Koellreuter, 1950). Growers in Serbia and Croatia also report significant losses in blackberry production (Aleksic et al., 2012). In California, climate will be a limiting factor for disease development as the pathogen requires extended wet periods that are absent during the growing season from most of the state.

Worldwide Distribution: Europe: *Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, France, Germany, Hungary, Italy, Norway, Poland, Russian Federation, Scotland, Spain, United Kingdom*. North America: *United States* (Illinois, Massachusetts, Oregon, Pennsylvania, Washington). (Anonymous, 1960; Dennis, 1986; Farr and Rossman, 2019; Foister, 1961; Gonzalez Fragoso, 1916; Karacic et. al., 2011; Kovics, 1997; Melnik and Popushoi, 1992; Mulenko et al., 2008; Nordskog, et al. 2003; Quaedvlieg et al., 2013; Shaw, 1973; Subic, 2008; Videira et al., 2017; Vanev et al., 1997)

Official Control: *Septocyta ruborum* is on the PEdX ‘Harmful Organism List’ for the Republic of Korea and Peru (USDA PCIT, 2019). In California it has been assigned a temporary Q rating.

California Distribution: Sacramento County (see “initiating events”).

California Interceptions: None

The risk *Septocyta ruborum* would pose to California is evaluated below.

Consequences of Introduction:

- 1) Climate/Host Interaction:** This pathogen requires high humidity for spore germination. The necessary cool, wet conditions exist in the north coastal counties of California, and occasionally in other areas such as northern Sacramento in years that experience abnormally high or late rainfall.

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

Score: 1

- 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:** The host range is restricted to *Rubus* spp., but includes widely planted and economically important berries such as blackberries, boysenberries, and raspberries.

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 Dispersal Potential:** This pathogen can move locally with rain and sprinkler irrigation, and with human activities such as harvesting and pruning if done during wet weather. Long distance spread could occur with movement of infected nursery stock. Large numbers of conidia are produced and the pathogen can have multiple secondary cycles of infection in a single season.

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:** In areas with cool, wet climates, purple blotch is a serious disease of *Rubus* spp. requiring fungicide treatments and attention to proper sanitation practices.

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

Economic Impact: A, D

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: 2

- 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:** California has native *Rubus* spp., including *R. glaucifolius*, *R. lasiococcus*, *R. leucodermis*, *R. nivalis*, *R. parviflorus*, *R. spectabilis*, *R. ursinus* and *R. stringosus*. Some of these species
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are known to be susceptible to *S. ruborum* and others are potential hosts. Some have been commercialized and are cultivated for their fruit; many are widespread in the Sierra Nevada and other mountainous parts of the state and are important for birds. In Oregon and Washington, fungicides are used to prevent disease in nurseries and commercial plantings.

Environmental Impact: A, D, 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: 3

- 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 *Septocyta ruborum*: Medium (9)

Add up the total score and include it here. **9**

-Low = 5-8 points

-Medium = 9-12 points

-High = 13-15 points

- 6) Post Entry Distribution and Survey Information:** There is only one official record of *S. ruborum* infecting commercial boysenberries in California

Evaluation is 'Low'

Score: -1

-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 = 8*

Uncertainty: *none*

Conclusion and Rating Justification:

Based on the evidence provided above **the proposed rating for *Septocytia ruborum* is C.**

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Responsible Party:

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***Comment Period: 7/24/2019 through 9/7/2019**

***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.
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Proposed Pest Rating: C
