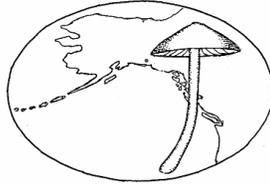


Pacific Northwest Fungi



Volume 1, Number 5, Pages 1-6
Published May 1, 2006

New North American host records for *Seifertia azaleae*, cause of *Rhododendron* bud blight disease

Dean A. Glawe¹ and Rita L. Hummel²

¹Department of Plant Pathology and ²Department of Horticulture and Landscape Architecture, Washington State University, Puyallup Research and Extension Center, 7612 Pioneer Way East, Puyallup, WA 98371-4998

Glawe, D. A., and R. L. Hummel. 2006. New North American host records for *Seifertia azaleae*, cause of *Rhododendron* bud blight disease. *Pacific Northwest Fungi* 1(5): 1-6. DOI: 10.2509/pnwf.2006.001.005

Corresponding author: Dean A. Glawe, glawe@wsu.edu

Accepted for publication April 12, 2006.

Copyright © 2006 Pacific Northwest Fungi Project. All rights reserved.

Abstract: *Seifertia azaleae*, cause of *Rhododendron* bud blight disease, is reported to occur on *Rhododendron hemsleyanum*, *Rhododendron ponticum*, and several named hybrids in western Washington State. This appears to be the first report of *S. azaleae* on these hosts in North America.

Key Words: *Briosia*, bud blast, bud blight, disease diagnosis, fungal morphology, plant pathogen, *Pycnostysanus*, *Rhododendron*

Introduction: *Seifertia azaleae* (Peck) Partridge & Morgan-Jones causes a disease of *Rhododendron* species that is termed bud blight or bud blast. Older synonyms of *S. azaleae* include *Periconia*

azaleae Peck, *Sporocybe azaleae* (Peck) Sacc., *Briosia azaleae* (Peck) Dearn., and *Pycnostysanus azaleae* (Peck) E. W. Mason (Partridge and Morgan-Jones, 2002). Disease

symptoms (Fig. 1) are striking; diseased flower buds die, become blackened, and bear numerous synnemata produced by *S. azaleae*. Death of 90% of *Rhododendron* flowers within a planting has been reported (Pirone, 1978). Infections are perennial (Chant and Gbaja, 1984). Insects are thought to play a role in vectoring the pathogen (Howell and Wood, 1962; Pirone, 1978; Viennot-Bourgin, 1981). In addition to the USA, *S. azaleae* has been reported from the UK (Howell and Wood, 1962), France (Viennot-Bourgin, 1981), Italy and Germany (Garibaldi et al., 2002), and Japan (Kaneko et al., 1988). The fungus has been reported (Farr et al., n.d.) from a number of species of *Rhododendron* in the USA including:

R. arborescens (Pursh) Torr.

R. catawbiense Michx.

R. macrophyllum D. Don ex G. Don

R. maximum L.

R. minus Michx.

R. nudiflorum (L.) Torr.

R. vaseyi A. Gray

R. viscosum (L.) Torr.

Of these hosts, only *R. macrophyllum* was reported in the Pacific Northwest (Callan et al., n.d.; Eglitis et al., 1966; Farr et al., 1996; Farr et al., n.d.). Further details of the occurrence of *S. azaleae*, including incidence, host and geographical range, in the region are lacking.

During 2002 the authors became aware of a number of *Rhododendron* plants in a private landscape planting in western Washington that displayed symptoms of bud blight disease. Consequently, in order to obtain more information about the host range of this fungus, *Rhododendron* species at two different sites in Western Washington were assessed for the presence of *S. azaleae*. This paper reports the results of these observations with information on the morphology and diagnostic features of *S. azaleae*, as well as the names of cultivars and species of *Rhododendron* determined to be hosts of the fungus.

Materials and Methods

Flower buds with symptoms resembling those in published descriptions of bud blight (e.g., Howell and Wood, 1962; Pirone, 1978) were examined and photographed using a Leica DMR compound microscope and a Leica MZ95 stereo microscope, both equipped with Leica DC300 digital cameras. Two study sites were used to assess disease incidence on different *Rhododendron* species and cultivars. One site was a private garden in Puyallup, Washington, which included plants representing several named cultivars of *Rhododendron* judged to be more than 50 years old. Surveys for the disease were also carried out in the Rhododendron Species Foundation and Botanical Garden, Federal Way, Pierce Co. Washington. The Rhododendron Species Garden is a major collection of Rhododendrons, including 10,000 plants on 8.9 hectares. Surveys were carried out by the authors and a group of six Master Gardener volunteers who examined *Rhododendron* plants during April of 2002 and 2003. The disease was detected on the basis of symptomatology and presence of synnemata of the reported causal agent, and the percentage of symptomatic buds on each plant was also determined. Voucher specimens were deposited with the Mycological Herbarium in the Department of Plant Pathology, Washington State University, Pullman (WSP).

Results

Disease symptomatology and morphology of the causal agent:

Disease symptoms (Fig. 1) were manifest on flower buds that died, became blackened, and bore numerous, macroscopically visible synnemata. Synnemata (Fig. 2) were formed on dead buds and were numerous, erect, dark brown to black, 650-1500 x 50-90 μm , each bearing an apical single globose conidiogenous region

measuring 200-450 x 150-350 μm . Conidiogenous cells (Fig. 3) were more or less cylindrical or doliiform, approximately 8-22 x 4-10 μm , and formed conidia holoblastically at one or two conidiogenous loci. Conidia (Fig. 4) were subspherical to pyriform or irregular, dark brown, (3.5-)4.5-7(-10) x (3-)3.5-5.5(-7) μm ; sometimes they produced secondary conidia (Fig. 5). Observed features fit previous descriptions (Ellis, 1978; Partridge and Morgan-Jones, 2002) for *S. azaleae*.

Incidence and hosts: The fungus was found on a single, specimen plant of *Rhododendron hemsleyanum* E. H. Wilson at the Rhododendron Species Foundation and Botanical Garden. This was the only plant in the Garden found to host the fungus.

Diseased plants observed June 12, 2003 at the other study site included *Rhododendron ponticum* L. (5% or fewer infected buds found on three plants) and the following named cultivars (approximate % of infected buds of single plants of each cultivar noted in parentheses):

Rhododendron 'Furnival's Daughter' (known ancestry includes *R. griffithianum* and *R. caucasicum* [Cox and Cox, 1988; Salley and Greer, 1992]) (25% infected buds)

Rhododendron 'The Honourable Jean Marie de Montague' (ancestry includes *R. griffithianum* [Greer, 1996]) (50-60% infected buds)

Rhododendron 'Sappho' (ancestry uncertain but may include *R. arboreum* [Cox and Cox, 1988] or *R. maximum* L. [Salley and Greer, 1992]) (1% infected buds)

Rhododendron 'Blue Peter' (a probable *R. ponticum* hybrid, [Cox and Cox, 1988; Salley and Greer, 1992]) (15% infected buds)

Rhododendron 'Pink Pearl' (known ancestry includes *R. arboreum*, and *R. griffithianum*, and may include *R. catawbiense* Michx., *R. maximum* L. or *R. ponticum* (Cox & Cox, 1988; Salley and Greer, 1992) (90% infected buds)

Diseased buds included those formed during the current year, as well as dead

buds formed as many as five years previous to the study (as indicated by the position on whorled branches).

Discussion

This report appears to be the first record of *S. azaleae* on *R. hemsleyanum*, and the first report of this fungus on *R. ponticum* in North America.

Rhododendron ponticum was reported previously as a host in the UK (Howell and Wood, 1962; Chant and Gbaja, 1984). The large collection of named and species *Rhododendrons* at the *Rhododendron* Species Foundation and Botanical Garden offered an unusual opportunity to survey a diverse collection of 10,000 plants for the disease. It was rather surprising that only a single diseased plant was found in the Garden. The discovery of the disease in the collection did indicate that plants in the collection are subject to inoculum of the pathogen. It may be that disease incidence is limited by a low number of susceptible genotypes in the collection, unfavorable environmental conditions, or some other factor. It seems unlikely that the time of year at which observations were made would have affected significantly the results since diseased buds were found remaining on plants for several years in the other study site, a feature of the disease noted previously (Pirone, 1978).

The results from observations at the other study site are consistent with Pirone's (1978) observation that high percentages of flower bud can be killed on susceptible cultivars. Although the numbers of plants observed in this study are insufficient for drawing conclusions about relative degrees of resistance or susceptibility, observations reported herein do suggest that the disease can be important when susceptible cultivars are grown in locations conducive to development of this disease. The finding of *S. azaleae* on *R. ponticum* is reminiscent of earlier reports in the UK

(Howell and Wood, 1962; Chant and Gbaja, 1984). The finding of synnemata on diseased buds that remained attached to plants for several years suggests that they might continue to serve as a significant source of inoculum, and that removing diseased buds might offer a means of disease control suitable for homeowners.

Previous reports suggest that insect vectors are involved in this disease cycle, but there seems to be disagreement as to which, if any, insects might serve as vectors. Pirone (1978) stated that bees vector spores during pollination, while Howell and Wood (1962) suggested that the rhododendron leaf hopper (designated by them as *Graphocephala coccinea*) may be a vector. In contrast, although Kaneko et al. (1988) found *S. azaleae* associated with oviposition holes in buds caused by the moth *Earias roseifera*, they demonstrated that the fungus did not require wounds to infect buds. Thus, although an unidentified species of *Graphocephala* has been observed on *Rhododendron* in western Oregon (Antonelli, unpublished), the possible role of insect vectors of *S. azaleae* in the Pacific Northwest remains unclear. Research on the possible role of insect vectors of this pathogen in the Pacific Northwest would clarify our understanding of the disease cycle, host ranges, and geographical distribution of this *Rhododendron* pathogen.

Acknowledgments

Washington State University Agricultural Research Center Project 0313. The authors thank the Washington State University Master Gardeners for assistance with this project, and Dr. A. L. Antonelli for information on insects associated with *Rhododendron* species in the Pacific Northwest. The authors thank Drs. Frank Dugan and Jack Rogers for reviewing the manuscript and offering helpful criticisms.

Literature Cited

- Callan, B., A. Thomson, A. Fernando, F. Ring, and D. Lowe. (n.d.) *PFC Index of Plant Pathogens, Plant Associated Microorganisms and Forest Fungi of British Columbia*. Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, Victoria, BC, Canada.
http://www.pfc.cfs.nrcan.gc.ca/biodiversity/herbarium/herb_search_e.html
- Chant, S. R., and I. S. Gbaja. 1984. Scanning electron microscopy of colonization of *Rhododendron* by *Pycnostysanus azaleae*. *Transactions of the British Mycological Society* 83: 233-238.
- Cox, P.A., and K.N.E. Cox. 1988. *Encyclopedia of Rhododendron Hybrids*. Timber Press, Portland, Oregon.
- Eglitis, M., C. J. Gould, and F. Johnson. 1966. Fungi found on Ericaceae in the Pacific coastal area. *Washington State University Agricultural Experiment Station Bulletin* 675: 1-21.
- Ellis, M. B. 1976. *More Dematiaceous Hyphomycetes*. CAB International. Kew, Surrey, England.
- Farr, D. F., H. B. Esteban, and M. E. Palm. 1996. *Fungi on Rhododendron: a world reference*. Parkway Publishers, Inc.
- Farr, D.F., A.Y. Rossman, M.E. Palm, and E.B. McCray. (n.d.) *Fungal Databases*. Systematic Botany & Mycology Laboratory, ARS, USDA. Online.
<http://nt.ars-grin.gov/fungaldatabases/>
- Garibaldi, A., G. Gilardi, D. Bertetti, and M. L. Gullino. 2002. First Report of *Pycnostysanus azaleae* on *Rhododendron* in Italy. *Plant Disease* 86: 560.

Kaneko, S., Y. Yokozawa, and T. Kubono. 1988. Bud blight of *Rhododendron* trees caused by *Pycnostysanus azaleae*. *Annals of the Phytopathological Society of Japan*. 54: 323-326.

Howell, P. J., and R. K. S. Wood. 1962. Some factors affecting rhododendron bud blast and its control. *Annals of Applied Biology* 50: 723-733.

Partridge, E. C., and G. Morgan-Jones. 2002. Notes on Hyphomycetes. LXXXVIII. New genera in which to classify *Alysidium*

resinae and *Pycnostysanus azaleae*, with a consideration of *Sorocybe*. *Mycotaxon* 83: 335-352.

Pirone, P. P. 1978. *Diseases and Pests of Ornamental Plants*. 5th Ed. John Wiley & Sons. New York.

Viennot-Bourgin, G. 1981. Observation simultanée en France du bud blast du *Rhododendron* et d'une cicadella jouant le rôle de vecteur. *Revue d'Agronomie* 1: 87-92.

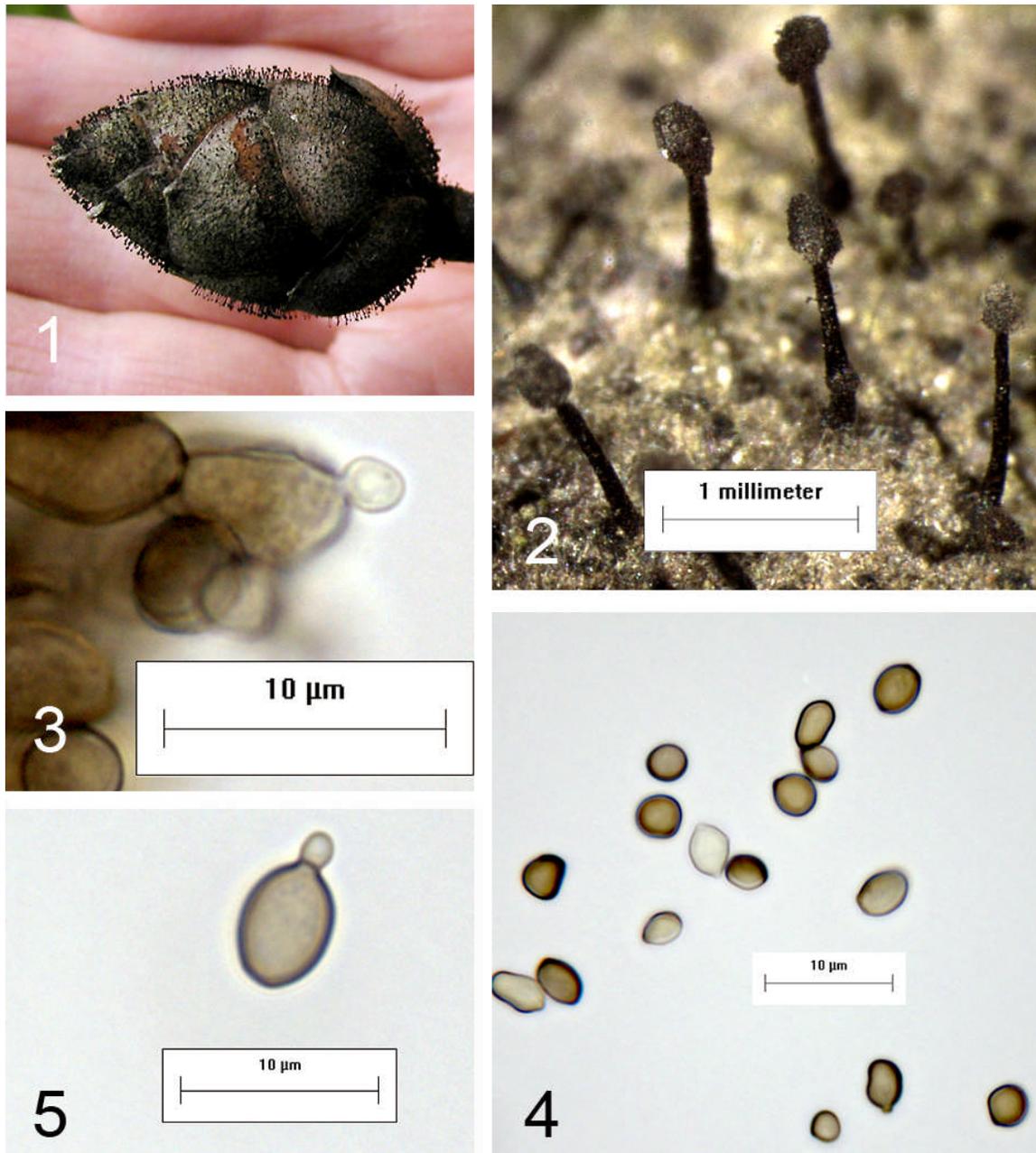


Fig. 1. Typical disease symptoms and signs indicative of rhododendron bud blight (on *Rhododendron hemsleyanum*) caused by *S. azaleae*. Fig. 2. Synnemata of *S. azaleae*. Fig. 3. Conidiogenous cells of *S. azaleae*. Fig. 4. Conidia of *S. azaleae*. Fig. 5. Conidium of *S. azaleae* producing a secondary conidium.