

Pycnostysanus azaleaeによるツツジ類の芽枯病(新称)

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著者名	金子, 繁 横沢, 良憲 窪野, 高德
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Bud Blight of *Rhododendron* Trees Caused by *Pycnostysanus azaleae*

Shigeru KANEKO*, Yoshinori YOKOZAWA* and Takanori KUBONO*

Key words: *Pycnostysanus azaleae*, *Rhododendron*, bud blight.

During the past 2-3 years it has been noted that *Rhododendron japonicum* growing on the Appi-kogen (tableland) (Appi-dake national forest, Ashiro-cho, Iwate Pref.) did not bloom fully. The *Rhododendron* trees grow naturally on the tableland (800-1,000 m above sea level), and severe damage was observed through ca. 8 ha. We investigated this occurrence, and found that the major cause was bud blight caused by *Pycnostysanus azaleae* (Pk.) Mason (Deuteromycotina—Hyphomycetes), which has not been recorded previously in Japan. This paper reports the results of isolation and inoculation experiments and describes the symptoms and signs of the disease and the morphology of the causal fungus.

Symptoms and signs of the disease. The first symptom appeared in autumn as necrosis of the scale bases of new flower buds. The color of the whole flower bud then became brown by winter. During May to June of the next year, black hair-like synnemata (Figs. 1, 2) of a fungus appeared on the overwintered blighted flower buds. The synnemata were also observed on older flower buds and twigs with blighted buds throughout spring to autumn. The synnemata were rarely observed on necrotic spots on living leaves. After rainfall or under conditions of high humidity, droplets including numerous conidia exuded from the top of synnemata (Figs. 3, 4). The blighted flower bud did not bloom. In severe cases, 90% of the flower buds of a shrub were damaged.

Isolation and culture of the fungus. The isolation experiment was carried out in September, 1986, from blighted and healthy flower buds and leaves with or without necrotic lesions after sterilizing the surface. A fungus was isolated on PDA medium from 90% of the blighted buds. It was not isolated from leaves with necrotic lesions.

In culture experiments, many synnemata (Fig. 5) began to appear within 4 days when colonies of the fungus on PDA in test tubes were taken from the tubes and placed in petri dishes under a white fluorescent lamp at 20 C. The synnemata were also produced on autoclaved flower buds and leaves of *Rhododendron japonicum* in test tubes under illumination at 20 C within 60 days after inoculation with colonies. This fungus was also isolated from germinating conidia collected from a synnema formed on a blighted flower bud. No difference was found in morphological characteristics of conidia between those produced on blighted buds in the fields or in cultures.

Morphological characteristics of the fungus. Colonies wooly, olive to dark grayish brown. Synnemata black, 0.5~2.5 mm long $\times$ 250~500 μ m wide, head capitate with mass of conidia (Figs. 2~4). Conidiogenous cells terminal, cylindrical to doliiiform, brown, 11~19 $\times$ 5~8 μ m (Figs. 6, 7). Conidia holoblastic, formed in acropetal chains (Figs. 8, 9), each conidium has 1~3 conidiogenous loci, globoid to ellipsoidal, pale brown, smooth, one-celled, 6~11 $\times$ 4~7 μ m. The fungus was identified as *Pycnostysanus azaleae*¹⁾ (Syn. *Sporocybe azaleae* (Pk.) Saccardo, *Briosia azaleae* (Pk.) Dearness) based on the morphological characteristics. Sutton¹⁾ described the conidiogenous cells of *Pycnostysanus azaleae* as holoblastic. Primary conidium

* Tohoku Research Center, Forestry and Forest Products Research Institute, Shimokuriyagawa, Morioka, Iwate 020-01, Japan 森林総合研究所東北支所
1) Sutton, B. C. (1973). Mycol. Pap. 132: 1-143.

Table 1. Results of inoculation experiments with *Pycnostysanus azaleae* on the flower buds of *Rhododendron japonicum*

Exper. No.	Inoculum	Wounding	Date of inoculation	No. of buds inoculated
I	Conidia on host	No wound	Aug. 2, 1986	10
	Control	No wound	Aug. 2, 1986	10
II	Conidia on PDA	No wound	Sept. 19, 1986	20
	Conidia on PDA	Wounded	Sept. 19, 1986	20
	Colonies on PDA	Wounded	Sept. 19, 1986	20
	Control	Wounded	Sept. 19, 1986	20
	Control	No wound	Sept. 19, 1986	20
Nov. 19, 1986		May 9, 1987		
Rate (%) of blighted buds		Rate (%) of buds with synnemata	Rate (%) of blighted buds	Rate (%) of buds with synnemata
100		0	100	80
0		0	0	0
75		0	85	85
100		0	100	100
100		0	100	100
5		0	25	0
0		0	0	0

of this species, however, may originate in enteroblastic form (Figs. 6, 7). More precise study will be needed on the ontogeny of conidium development of this species.

Inoculation with the fungus. To demonstrate the pathogenicity of the fungus, inoculation experiments were conducted with *Rhododendron japonicum* in a chamber and in a nursery of the Institute. When conidial suspension obtained from the colonies on PDA was put on the surface of flower buds and leaves of cut shoots of the *Rhododendron* in a humid chamber under a white fluorescent lamp at 20 C, the flower buds and leaves began to produce necrotic lesions 10 days after inoculation. The inoculated flower buds became brown in color 20 days after inoculation. Synnemata bearing conidia began to appear on the necrotic leaves and flower buds 15 days and 31 days after inoculation, respectively.

Inoculations were also conducted onto the flower buds of planted *Rhododendron japonicum* shrubs in a nursery of the Institute, using conidia or colonies formed on PDA or conidia from diseased flower buds. The inoculated twigs were covered with polyethylene bags for the first 3 days to maintain high humidity. Under natural conditions, blighted flower buds were often found to be associated with an oviposition hole of a moth, *Earias roseifera*. Therefore, some buds were inoculated after making a hole of ca. 3 mm deep with a sterilized needle. The inoculated flower buds became brown by winter of the year. Synnemata appeared on the brown flower buds in May of the following year (Table 1). The fungus was re-isolated from the blighted buds whether synnemata were found or not. These results proved that *Pycnostysanus azaleae* causes the flower bud blight with no special association with wounds.

This disease of *Rhododendron* caused by *Pycnostysanus azaleae* has been recorded in the U.S.A.²⁾, Canada¹⁾ and England³⁾. Davis⁴⁾ described the life cycle and pathogenicity of the

2) Schmitz, H. (1920). *Phytopathology* 10: 273-278. 3) Ellis, M. B. and Ellis J. P. (1985). *Micro-fungi on Land Plants*. Croom Helm, London. pp. 222-223. 4) Davis, W. H. (1939). *Phytopathology* 29: 517-529.

fungus, and named the disease as bud and twig blight. In our experiments, pathogenicity to twigs has not been proved yet. This is the first record of this disease in Japan.

Through field survey, the same disease has been found in several localities other than the Appi-kogen on *Rhododendron japonicum* and other *Rhododendron* species as follows: On *R. japonicum*—Hiraniwa-kogen and Hayasaka-kogen in Iwate Pref.; On *R. brachycarpum* (Hakusan-shakunage)—Mt. Iwate and Mt. Hachimantai in Iwate Pref.; On *R. kaempferi* (Yamatsutsuji)—Daiwa-cho in Miyagi Pref. Damage to *R. brachycarpum* and *R. kaempferi* was not as severe as *R. japonicum*.

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和 文 摘 要

金子 繁・横沢良憲・窪野高德: *Pycnostysanus azaleae* によるツツジ類の芽枯病 (新称)

岩手県安比高原に自生するレンゲツツジに広く発生した花芽の枯死症状について調査した結果、主原因は *Pycnostysanus azaleae* の感染による病害であることが明らかになった。本病は日本では初めて発生が確認されたものであり、病徴、標徴、および病原菌の形態的特徴を記載した。本病の発生は自生するハクサンシャクナゲ (岩手県内) およびヤマツツジ (宮城県内) でも認められたが、被害程度はレンゲツツジに比べ軽かった。本病の病名として芽枯病 (bud blight) を提唱する。

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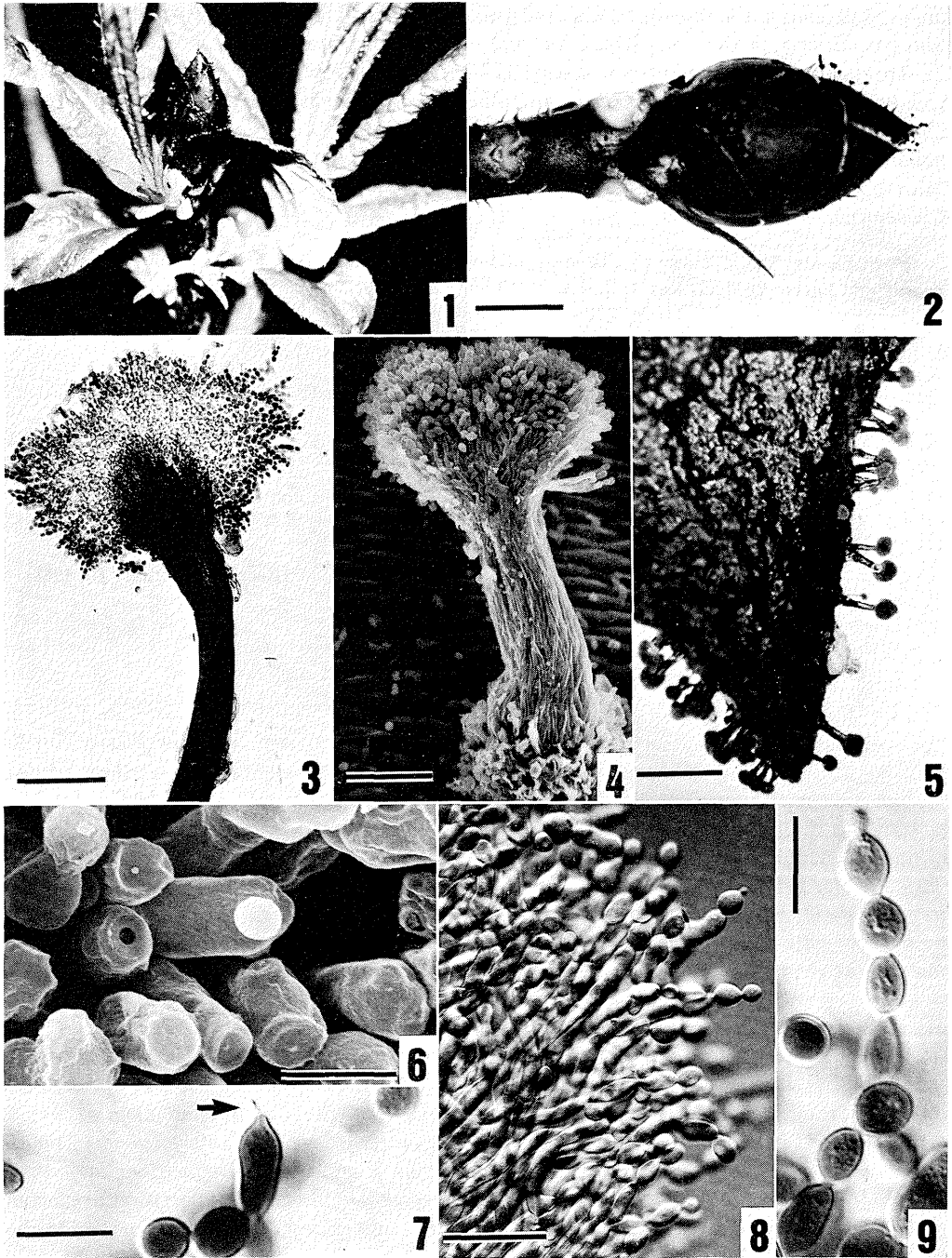


Plate I. Bud blight of *Rhododendron japonicum* and the causal fungus, *Pycnostysanus azaleae*.

1, 2. Symptoms and signs. 3. A synnema with conidial chains. 4. A synnema under SEM. 5. Synnemata formed on PDA. 6. Apical part of conidiogenous cells under SEM. 7. A conidiogenous cell producing a conidium (arrow). 8, 9. Conidial chains.

Scales: 2=5 mm; 3=40 μ m; 4=20 μ m; 5=4 mm; 6=3 μ m; 7, 9=10 μ m; 8=20 μ m.