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The Causal Organism of Pear Scab in Korea

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韓國 배 黑星病 病原菌 硏究

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Abstract: To identify a causal organism of pear scab in Korea, pathogens were isolated from pears of different varieties. *Venturia nashicola* was found to be the pathogen of the scab disease in Korea.

Keywords: Pear scab, *Venturia nashicola*

The scab disease in Japanese pears (*Pyrus serotina* Rehder) was recorded as caused by *Venturia pirina* in Korea (Korea Plant Prot. Soc., 1972). Tanaka and Yamamoto, however, reported that *V. nashicola* was the causal organism which showed some differences from *V. pirina* in pathogenicity to Japanese pears and western pears (*Pyrus communis* L.) and other mycological characteristics (Tanaka *et al.*, 1964; Udagawa *et al.* 1978). When we collected diseased leaf samples to see morphological characteristics of the pathogen, inoculated detached pear leaves and investigated natural incidences of the scab, the scab fungus pathogenic to pears in Korea appeared to be close to *V. nashicola* rather than to be *V. pirina*.

Materials and Methods

Severity of the scab disease incidence was investigated on June 27 and 28, 1984 at the orchard of Horticulture Experiment Station Naju branch in Naju, Cheonnam province, Korea, and on June 25 at the orchard of Horticulture Experiment Station, Suweon, Korea.

The observed pears were Japanese pear cultivar Shingo and Mansamgil and a western pear of unknown cultivar. Five plants, one thousand leaves per plant, were observed for diseased leaves. The western pears grown were 10 m away from the Japanese pears.

Similarly, incidences of the scab were investigated in European pears, Beurre Delicious, Flemish Beauty and Winter Nelis, and a Japanese pear Shingo in Suweon.

Length and width of conidia and conidiophores were observed by detaching fungal mass from the diseased leaves collected in Suweon and Naju. Microscopic measurements were conducted at ×400 for 100 spores and 50 conidiophores with a scale placed on the objective lens.

For pathogenicity, healthy looking leaves were moistened by placing one Whatman No. 2 filter paper and plastic supporter in Petri dishes. Five leaves of the Japanese pear Shingo, and each of European pears Winter Nelis, Beurre Delicious

and Flemish Beauty were inoculated by pricking three or four times with a needle and scraping off the fungal mass to the wounded spots with a camel brush. For the control, three leaves of the above pears were pricked with the same needle but not inoculated. The leaves in Petri dishes inoculated and uninoculated were incubated and observed for characteristic symptoms of the scab disease.

Results and Discussion

The scab disease occurred only in Japanese pears, Mansamgil and Shingo at Naju(Table I).

European pears, Beurre Delicious, Flemish Beauty, and Winter Nelis showed no incidence of the scab whereas Japanese pear Shingo showed 3.4% diseased leaves in Suweon(Table II).

The scab disease in Japanese pear generally began to occur from the early May and became severe during mid June. In July and August, the incidence did not appear to be built up, however, it occurs severely again from September in Korea. No incidence of the scab in western pears in June indicated strongly that the causal organism of the scab in Japanese pears was different from *V. pirina* at least in pathogenicity. The results of pathogenicity test showed development of the scab disease on leaves of Shingo but not on leaves of Winter Nelis, Beurre Delicious, and Flemish Beauty(Table III).

Table I Incidence of pear scab in Naju, Korea.

Pear observed	% of diseased leaves
Japanese pear	
Mansamgil	7.5
Shingo	10.2
European pear	0

Table II Incidence of pear scab in Suweon, Korea.

Pear observed	% of diseased leaves
European Pear	
Beurre Delicious	0
Flemish Beauty	0
Winter Nelis	0
Japanese Pear	
Shingo	3.4

Table III. Pathogencity tests ofpear scab fungus to leaves of Japanese pear and European pear.

Pear tested	Length of lesion(cm) on leaf							
	Inoculated					Uninoculated		
	1	2	3	4	5	1	2	3
European pear								
Winter Nelis	0	0	0	0	0	0	0	0
Beurre Delicious	0	0	0	0	0	0	0	0
Flemish Beauty	0	0	0	0	0	0	0	0
Japanese pear								
Shingo	2.5	3.0	1.7	0	1.0	0	0	0

The length of conidia ranged from 8.0 to 25.0 μm and the average length was 14.6 μm. The width of conidia ranged from 5.0~8.0 μm with an average of 6.4 μm. The length and width of conidiophores ranged from 7.5 to 22.5 μm and 3.5 to 5.5 μm, respectively. The average length and width of conidiophores were 13.5 and 4.6 μm, respectively. Of the measurements the length of conidia, 14.6 μm and the length of conidiophores, 13.5 μm appeared to be close to 14.4 and 11.8 μm of *V. nashicola* than 18.5 and 27.2 μm of *V. pirina* (Tanaka *et al.*, 1964).

Based on the field incidence of the scab, pathogenicity test and morphological measurements, the Korean isolates we tested were close to *V. nashicola* rather than *V. pirina*. However, we were not able to compare with isolates from western pears or *V. pirina*.

Also we do not know whether the scab can occur if the western pears are cultivated widely

in Korea or more pear cultivars are tested. Our results do not exclude the possibility that Korean scab isolates might be a variant or race of *V. pirina*.

Captan (×500) and Capen (×800) were registered for control of the scab in Korea. The efficacy of other fungicide in the control of the scab was known to be dependent upon the concentration of other fungicides for example, ×1,000 dilution is effective againt *V. nashicola* but more than ×2,500 dilution is effective against *V. pirina* (Ju, personal communication). Thus our results may help in determination of fungicide concentration for the control of the scab in Korea.

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적 요

한국에 발생하는 배나무 검은별 무늬병 병원균의 특성과 병원성을 조사한 결과 한국에서 분리된 검은별 무늬병균의 분생자의 길이와 폭은 평균 14.6-6.4 μm 이었으며 분생자경의 길이와 폭은 평균 13.5-4.6 μm 이었다. 병원성 검정은 Flemish Beauty, Beurre Delicious, Winter Nelis (서양배), 신고(일본배)에 인공상처 접종한 결과 신고의 잎에서만 전형적인 검은별 무늬병의 병징이 재현 되었다. 이상의 결과로 보아 한국에서 발생하고 있는 배 검은별 무늬병균은 *V. nashicola*에 가까운 것으로 판정 되었다.

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