

Anthracnose of Peanut Caused by *Colletotrichum gloeosporioides*

Ju-Hee Kim*, Yong-Hoon Lee¹ and Wang-Hyu Lee²

Department of Plant Environment, Chonbuk Agricultural Technology Administration., Iksan 570-140, Korea

¹Honam Agricultural Experiment Station, RDA, Iksan, Chonbuk 570-080, Korea

²Chonbuk National University, Chonju, 561-756, Korea

*Colletotrichum gloeosporioides*에 의한 땅콩 탄저병

김주희* · 이용훈¹ · 이왕휴²

전라북도 농업기술원 식물환경연구과, ¹호남농업시험장 식물환경과, ²전북대학교 농생명학과

ABSTRACT: Anthracnose of peanut (*Arachis hypogaea* L.) was found in the peanut cultivating fields in Iksan, Korea in September 1997. Infected plants showed irregularly circular water soaking brown lesions. In the severe case, leaves and stems were entirely died. The causal fungus of anthracnose isolated from the diseased plants was identified as *Colletotrichum gloeosporioides* Penz. and its teleomorph was *Glomerella cingulata* (Stonem.) Spauld. & Sch. according to the criteria based on the cultural and morphological characteristics. By artificial inoculation with fungal spores on healthy peanut, anthracnose symptom was observed 15 days after inoculation.

Key words: anthracnose, *Colletotrichum gloeosporioides*, peanut.

Many researchers have been reported that anthracnose was developed in many crops and ornamental plants (3-10), but not on peanut plants (*Arachis hypogaea* L.) of Korea. It occurred up to 30% in peanut cultivating areas of Iksan in 1997.

The initial symptoms on the leaves and stems of peanut were appeared to be irregularly round or circular water soaking, brown lesions. Sometimes spots enlarge rapidly, become irregular, and develop on the entire leaflet. The size of these spots gradually increased and coalesced to form large circular brown lesions. Infected leaves and stem were eventually died (Fig. 1).

The fungus isolated from diseased peanuts initially formed gray colony and formed rounded ring colony on potato dextrose agar (PDA).

The colony also formed light orange-colored conidial mass in the PDA about 3 days after incubation and developed into black mass of acervuli. Conidia were aseptate, colorless, cylindrical and rounded at the apex and measured 15~20.3×3~4.3 μm (average 16.8×3.7 μm) in size (Fig. 2). Appressoria were brown clavate-cylindrical and measured 10~22.5×7~10 μm (average 12×8.2 μm) in size (Fig. 3). Setae were dark brown, 2~4 septae and measured 85~117.5×2.8~3.3 μm (average

98.9×3.0 μm) (Fig. 4).

The morphological characteristics of *Colletotrichum* sp. isolated from the diseased peanut were compared with the others (Table 1). All *Colletotrichum* sp. isolated from the anthracnose symptoms were identified as *Colletotrichum gloeosporioides* according to the classification of von Arx. (1, 2) and Sutton (13) (Table 1). In this study, the size and shape of conidia, and presence of setae were consistent with the anthracnose pathogen of citrus, bean and cyclamen reported by Chung and Koh (4), Han and Lee (5) and Kim *et al.* (7), respectively.

Size of the asci was 40~52.5×7.5~8.8 μm (average 46.3×8.6 μm) (Fig. 5). There were eight ascospores in an ascus. Ascospores were slightly curved at the centers, and measured 12.5~17.5×3~5.3 μm (average 15.2×3.9 μm) (Fig. 6). Teleomorph of the fungus produced in PDA culture was identified as *Glomerella cingulata* (Stonem.) Spauld. & Sch. according to the classification of von Arx. (1, 2) (Table 1). It was identical with the anthracnose pathogen of static reported by Choi *et al.* (3).

Isolates of *C. gloeosporioides* isolated from anthracnose lesions on peanut leaves and stems were used for pathogenicity test. Isolates were cultured on PDA at 25°C for 14 days. Conidial suspension was prepared from PDA cultures. The concentration of conidia for inoculation was adjusted to 10⁶ conidia per ml. Twenty ml of spore

*Corresponding author.

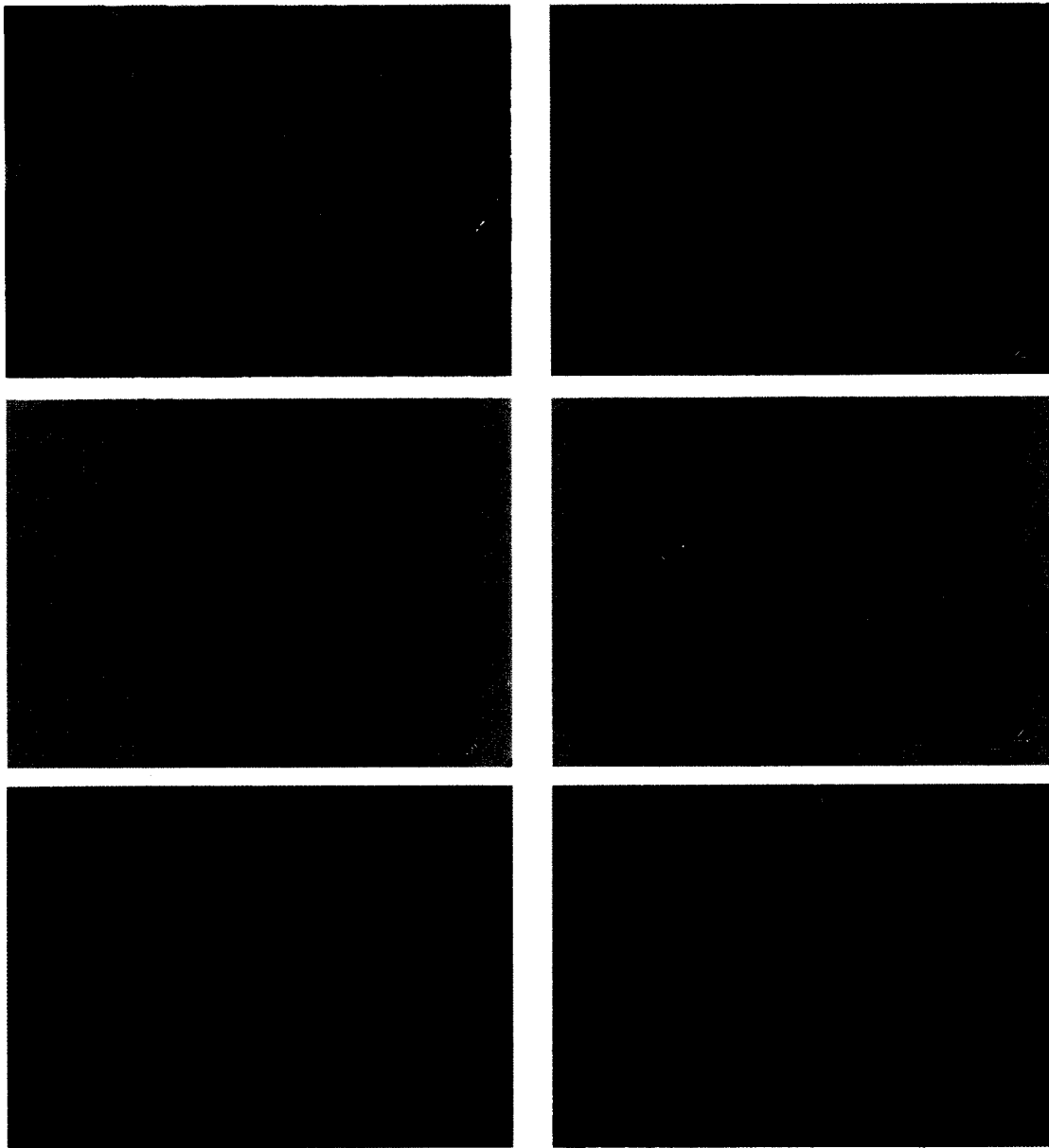


Fig. 1~6. Symptom of anthracnose caused by *Colletotrichum gloeosporioides* in the leaves of peanuts (Fig. 1). Phothomicrograph of *C. gloeosporioides* conidia (Fig. 2), setae (Fig. 4) ascus (Fig. 5), ascospores (Fig. 6) on potato dextrose agar, and appressoria (Fig. 3) on slide culture. The scale bars represent 10 μ m (2~6).

suspension were sprayed onto the peanut plants. Inoculated plants were placed in a humid chamber with 100% relative humidity at 26~28°C for 15 days. Symptoms were assessed about 15 days after inoculation. Anthracnose symptoms of peanut plants produced by artificial inoculation were essentially identical with those in the field (Table 2).

C. gloeosporioides Penz. has nearly 600 different names of *Gloeosporium*, *Colletotrichum* and other genera (9). The fungus showed variabilities in physiological characteristics

with a wide host range. Anthracnose of peanuts has been reported in the United States, Uganda, Taiwan, Senegal, India, Argentina and Tanganyika (12). Although it was widely distributed all over the world, there is no report in Korea. In foreign countries, the causal agent of peanut anthracnose was identified as *C. dematium*, *C. arachidis*, and *C. mangenoti* (12). However, this is the first report of anthracnose of peanut caused by *C. gloeosporioides* in Korea.

Table 1. Comparison of morphological characteristics of *Colletotrichum gloeosporioides* causing peanut anthracnose

	Morphological characteristics ^a		
	This study	Han & Lee(5), Chung & Ko(4) Kim et al(7)	Sutton(13), Arx(1,2)
Conidia shape	cylindrical	cylindrical	straight, obtuse at the apex(13), cylindrical(1)
color	colorless	colorless	- ^b
size	15~20.3×3~4.3 μm (16.8×3.7 μm)	7.5~17.8×3.5~5.6 μm (10.5×4.0 μm) (5) 14.4~19×4.6~6.0 μm (4) 8.25~15×2.5~6.3 μm(7) (12.27×4.25 μm)	9~24×3~4.5 μm(13) 10~21×4~6 μm (1)
Appressoria ^c shape	clavate or irregular sometimes becoming complex	lobed, clavate sometimes becoming complex	clavate or irregular sometimes becoming complex
color	brown to dark brown	sepia brown(5), brown to dark brown(7)	-
size	10~22.5×7~10 μm (12×8.2 μm)	5.3~10.5×10.5~17.5 μm (8.0×13.3 μm) (5) 6.5~11.3×5.0~8.5 μm (4) 10~12.5×5~7.5 μm(7)(10.2 × 5.4 μm)	6~20×4~20 μm
Setae	present	absent(5,7), present(4)	absent
Sclerotia	absent	absent	absent

^aAfter 10 days on PDA culture at 25°C.^bNot described^cAfter 4 days on slide culture at 25°C.**Table 2.** Pathogenicity of *Colletotrichum gloeosporioides* on different part of peanut plant

Part inoculated	Inoculation	Control
leaf	+++ ^a	- ^b
stem	+++	-

^a+++ : severe symptom.^b- : no symptom.

요 약

1997년 9월에 전북 익산지역에서 재배되고 있는 땅콩에 탄저병이 발생되었다. 감염 초기 병징은 잎 가장자리에 갈색 수침상 병반이 형성되었고, 점차 진행됨에 따라 병반이 확대되면서 심하면 잎이 고사되었다. 병반으로부터 분리한 균의 균학적 특성을 조사한 결과 땅콩 탄저병을 일으키는 병원균은 *Colletotrichum gloeosporioides*이었으며, 완전세대는 *Glomerella cingulata*로 동정되었다. 또한 분리된 병원균을 건전한 땅콩에 접종한 15일 후 동일한 병징이 나타났다.

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