

First Record of the Entomopathogenic Fungus *Zoophthora radicans* on the Green Peach Aphid *Myzus persicae* in Korea

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복숭아 흑진딧물에서 발견된 국내 미기록 곤충병원 사상균 *Zoophthora radicans*에 관한 보고

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ABSTRACT: An entomopathogenic fungus, *Zoophthora radicans*, was found causing epizootics in populations of the green peach aphid, *Myzus persicae*, on March 27, 1998 at Seongju Gun, Kyungbuk Province in Korea. Anamorphic characteristics of the fungus were described using light and scanning electron microscopy. Distinguishing characteristics of *Z. radicans* is formation of capilliconidia on a single slender secondary conidiophore.

KEYWORDS: Entomopathogenic fungus, *Zoophthora radicans*, Biological control agent

Zoophthora radicans (Brefeld) Batko (Zygomycetes; Entomophthorales) has received much attention because it infects a broad range of insect pests at least four orders (Glare *et al.*, 1987), and frequently cause high levels of disease in host populations (Furlong *et al.*, 1997; Pell *et al.*, 1993). Accordingly, much attempts are being made in many countries to isolate and select the most pathogenic indigenous isolate for development of biological control agent. However, occurrence of this fungus in Korea has never been reported despite of its potential use as a microbial insecticide.

On March 27, 1998, epizootics were observed decimating green peach aphids, *Myzus persicae* Sulzer in crown daisy-growing green-

houses located at Seongju Gun, Kyungbuk Province in Korea. Numerous cadavers of green peach aphids were collected, and the pathogen was identified on the basis of anamorphic characteristics.

Vegetative stages and sporulating structures on cadavers were mounted for microscopic observation, and transferred to tetracycline-contained Difco potato dextrose agar (PDA) within a few hours after collection. For scanning electron microscopy, pieces of diseased cadavers were fixed in 8% glutaraldehyde, and critical point dried following the procedure of Samson *et al.* (1979).

Our morphological observations of the collected specimens and pure culture were in agreement with original descriptions of *Z. radicans* (Ben Ze'ev and Kenneth, 1982a, 1982b). Herein, anamorphic characteristics of

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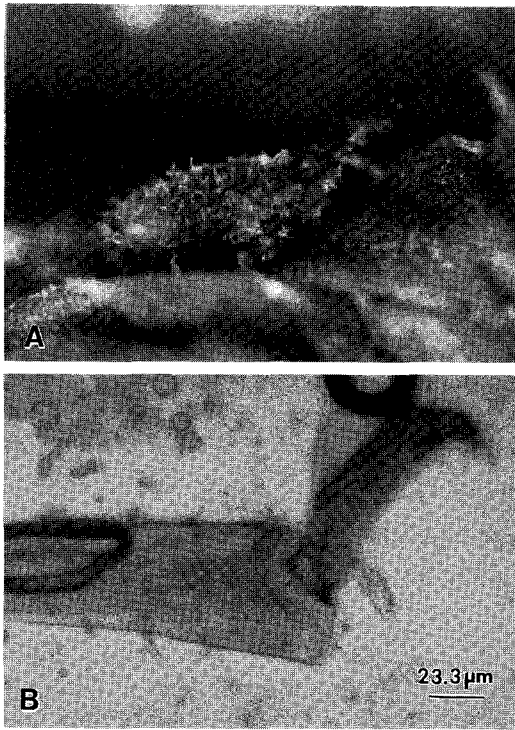


Fig. 1. (A) Vegetative stages and sporulating structures on the green peach aphid killed by *Zoophthora radicans*. (B) Hyphae-like structures which emerged from the leg.

the fungus, first observed in Korea, were described in details on the basis of the collected specimen and pure culture.

In vivo-infected specimens with *Z. radicans* were pale brown or orange brown, and exhibited an extensive external growth of hyphal bodies and sporulating structures which emerged from all parts of the body (Fig. 1A). The hyphal bodies are hyaline, short or rod-like, and variable in size, ranging from 5 μm to 7.5 μm in width (averaging 5.95 μm). In some cases, hyphal bodies resembled hyphae with irregular branches growing out the legs and other body parts (Figs. 1B and 2A). Conidiophores are branched digitately toward the apices, intertwining to form a continuous hymenium. Primary conidia are uninucleate, ovoid to elongate, bitunicate, 16.2~27 μm \times 4.0~7.56 μm (averaging 20.42 \times 5.99 μm), for-

cibly ejected by the eversion of the conspicuous basal papilla against the conidiophore, and have flared shoulders above a conical papilla (Fig. 2B). Outer wall layer of primary conidia are partially separated after discharge or in liquid mounts. Secondary conidia (capilliconidia) are similar to primary conidia or more globose, and formed at top of a single slender capillary secondary conidiophore (25.33~33.80 μm in height) (Figs. 2C and 2D). Rhizoid and resting spores were not observed. Cystidia are columnar.

As described above, this is the first report of epizootics caused by *Z. radicans* on *M. persicae* in Korea. Because of its infectivity to a broad range of agricultural insect pests, the fungus observed in Korea deserves further intensive study for use in microbial control of various domestic insect pests. Proliferation mode of capilliconidia is a distinguishing character of the *Z. radicans* as shown in Fig. 2. Thus, examination of capilliconidial morphology would serve as an useful aids in identifying *Z. radicans*.

적 요

*Zoophthora radicans*를 생물적 방제에 이용하기 위하여 각국에서는 우수 균주 탐색에 많은 노력을 하고 있지만 국내에서는 이 균이 보고된 바 없다. 본 연구자들은 이 균을 1998년 3월경 경북 성주군 축갓 재배 온실내의 복숭아 흑진딧물에서 발견하였다. 이에 국내에서 처음으로 *Z. radicans*를 보고하며, 무성세대의 형태적 특징을 기재한다. 이 균의 가장 중요한 분류학적 특징은 2차포자가 1차포자로부터 만들어진 긴 분생자병에서 형성되는 것이었다.

Acknowledgement

The authors wish to thank Dr. R. A. Humber for personal communications concerning identification of the fungus studied in the manuscript.

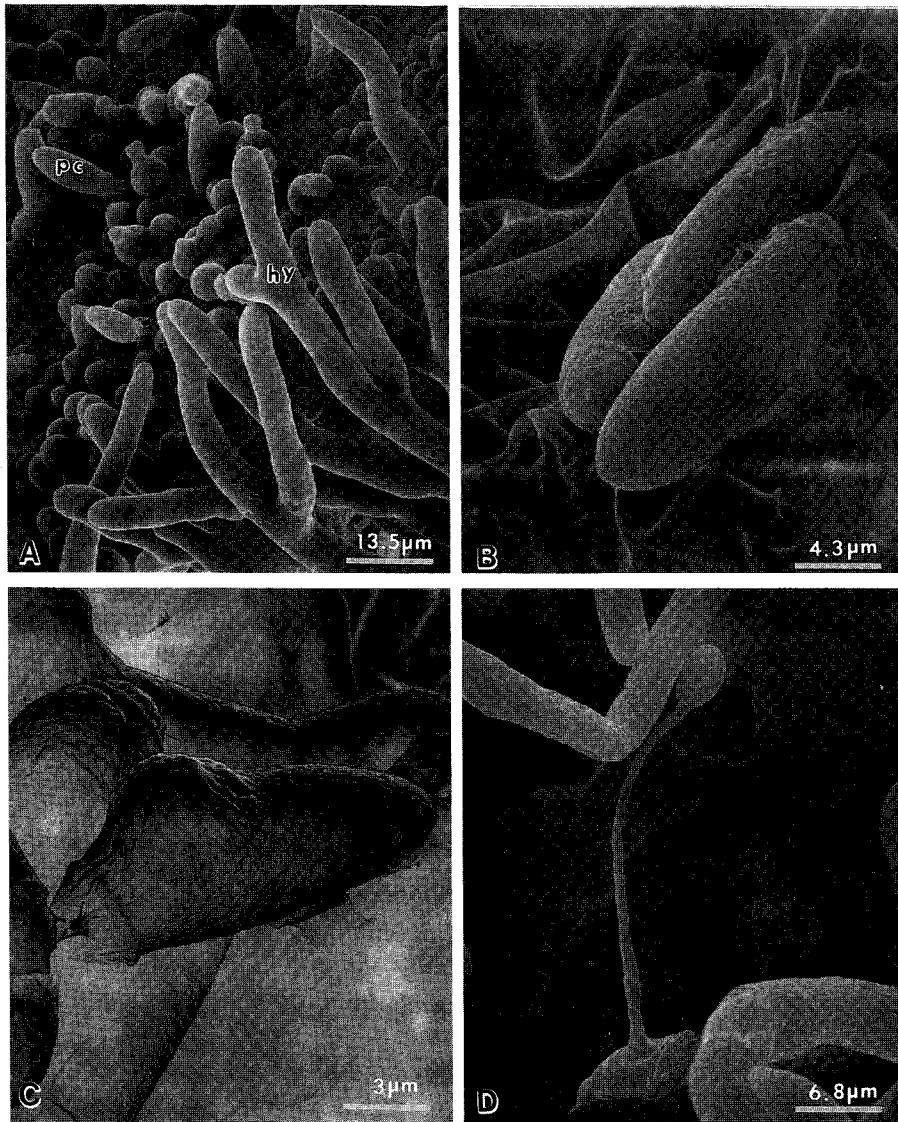


Fig. 2. (A) Hyphae-like structures (hy), and primary conidia (pc). (B) Primary conidia with flared shoulders. (C) Germinating primary conidia to form capillary secondary conidiophore. (D) Secondary conidia (capilliconidia) formed at top of a capillary secondary conidiophore.

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