THE KOREAN JOURNAL OF MYCOLOGY
Vol. 26, No 4, p413-415 December 1998

Printed in S. KOREA

Zoophthora phalloides Batko (Zygomycetes: Entomophthoraceae), a Fungal Parasite of the Aphid *Dactynotus* species in Korea

Cheol-Sik Yoon[1], Gi-Ho Sung, Seung-hwan Lee, Tae-Yu Yun and Jeang-Oon Lee*

[1]*Research Institute of Engineering and Technology, Korea University, Seoul 136-701, and Division of Agricultural Insect Pests, National Institute of Agricultural Science and Technology, RDA, Suwon 441-707, Korea*

Dactynotus 진딧물의 국내 미기록 곤충병원성 곰팡이, *Zoophthora phalloides*에 관한 보고

윤철식[1] · 성기호 · 이승환 · 윤태유 · 이정운*

[1]*고려대학교 공학기술연구소, 농업과학기술원 작물보호부*

ABSTRACT: An entomophthoraceous fungus, *Zoophthora phalloides*, was found in populations of the aphid *Dactynotus* species, at National Institute of Agricultural Science and Technology, and Jeonnam Provincial RDA during June, 1998. Occurrence of the fungus and aphid has never been recorded in Korea. Microscopic observations of this fungus are described, and illustrated. The fungus has sausage-shaped primary conidia with 28.98 μm in length, and two types of secondary conidiophores. Our specimens exhibit closer relationship with the North American isolates than with the European isolates on the basis of conidial length described by other study.

KEYWORDS: Entomophthoraceous fungus, *Zoophthora phalloides*, Aphid, *Dactynotus* species

The entomophthoraceous fungus, *Zoophthora phalloides* Batko has been considered as one of major aphid-attacking fungi because it has a wide host range, including Lepidoptera, Diptera, Homoptera and Hymenoptera (Glare *et al.*, 1987). 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 recorded despite of its potential use as a microbial insecticide.

Entomomycoses were noticed in populations of the aphid (*Dactynotus* sp.) on horseweeds during June 1998 at National Institute of Agricultural Science and Technology, and Jeonnam Provincial RDA in Korea. Numerous aphid cadavers were collected, and prepared for microscopic examination on glass slides in a drop of lactophenol or aceto-orcein by heating them gently. Our anamorphic observations of the collected specimens were in agreement with those of the *Z. phalloides* described by Ben-Ze'ev and Kenneth (1982) and Milner *et al.* (1980). Herein, morphological appearance of the fungus, first observed in Korea, was described and illustrated in details.

In vivo-infected specimens were dark brown or pale reddish (Fig. 1A). Rhizoids are present, consisting of one or occasionally more pseudorhizomorphs each ending in a sucker-like pad usually outgrowing from the abdomen (Fig. 1B). Cystidia are common and much longer than conidiophore (Fig. 1C). Conidiophores are branched (Fig. 2A), bearing uninucleate conidia (Fig. 2B). Primary conidia are cylindrical with a papilla at one end and generally rounded at the other, and

*Corresponding author

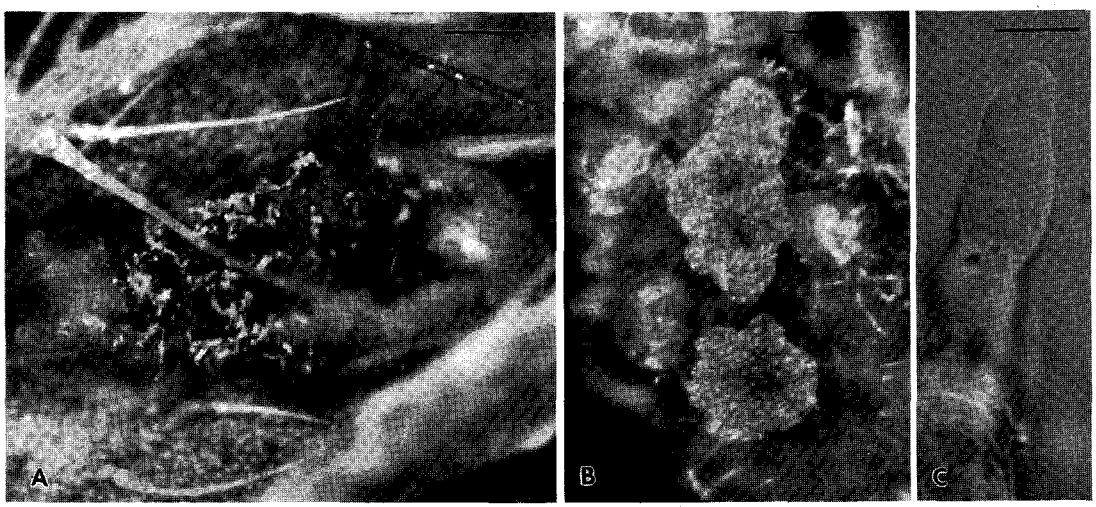

Fig. 1. (A) Vegetative stages and sporulating structures on *Dactynotus* species killed by *Zoophthora phalloides*. Bar=200 μm. (B) Pseudorhizomorphs outgrown from the abdomen, ending in a sucker-like pad. Bar=100 μm. (C) Cystidium extending above level of conidiophores. Bar=10 μm.

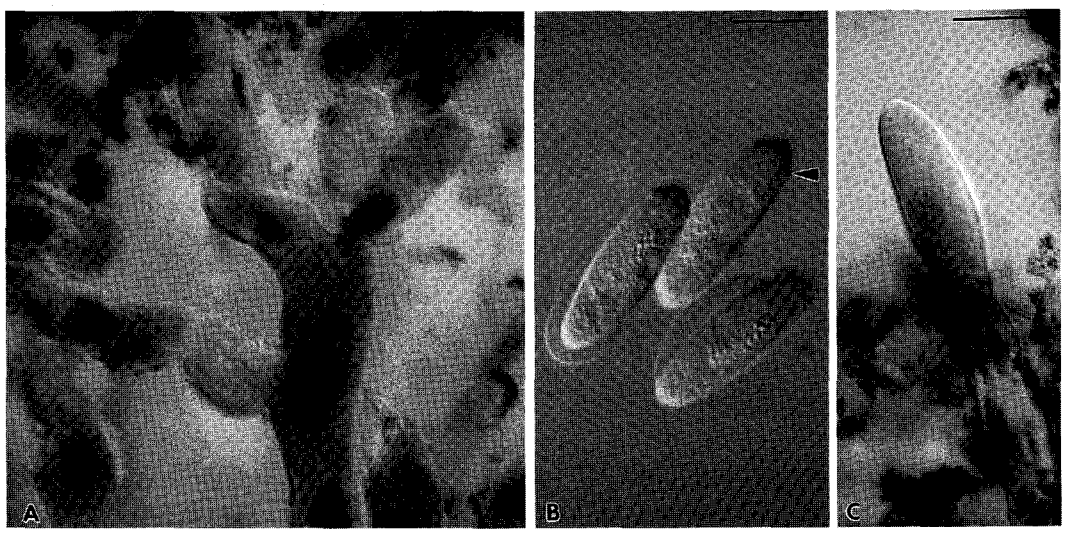

Fig. 2. (A) Digitate conidiophores. Bar=10 μm. (B) Cylindrical and bitunicate primary conidia with a papillar at one end and generally rounded at the other, and with slight flare (arrow) at junction between papillar and spore body. Bar=10 μm. (C) Aceto-orcein-stained uninucleate primary conidium. Bar=10 μm.

with slight flare at junction between papillar and spore body measuring 25-32.5 μm×6.5-12.5 μm (averaging 28.98 μm×8.94 μm) (Fig. 2C). The primary conidia of *Z. phalloides* produce secondary conidia in two ways: by producing a short outgrowth from which a secondary conidium is forcibly discharged resembling primaries (Fig. 3A); or by producing a long slender conidiophore which bears a capilliconidium (Figs. 3B & C). The frequency of each secondary conidium differs between specimens but capilliconidia are mostly produced. Capilliconidia are lunate to allantoid, produced in line with the capillary conidiophore (Fig. 3B) or at an angle (Fig. 3C), and passively dispersed. Hyphal bodies are bran-

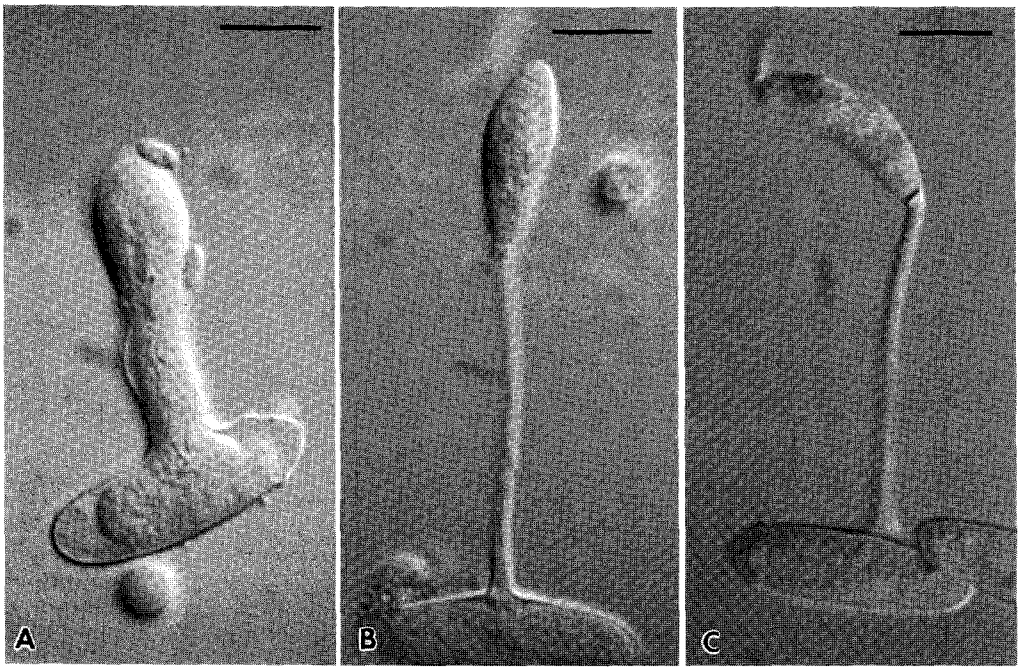

Fig. 3. (A) Secondary conidium formed on a short outgrowth of primary conidium. Bar=10 μm. (B) Capilliconidium produced in line with the capillary conidiophore. Bar=10 μm. (C) Capilliconidium produced at an angle. Bar=10 μm.

ched, elongate, and variable in size. Resting spores are invariably spherical, and are variable in size even within a specimen.

On the basis of length of primary conidia, taxonomic literature (Glare *et al.*, 1987) divides groups of *Z. phalloides* into the two types; North American and European types. Conidial length of North American isolates is under 33 μm, whereas that of European isolates is over 33 μm. Conidial length observed in our specimens indicated that Korean isolates of *Z. phalloides* with 28.98 μm conidia in length are taxonomically closer to the North American isolates than European isolates.

적 요

국내 미기록 곤충병원성 곰팡이, *Zoophthora phalloides*를 1998년 6월경 수원 농업과학기술원 및 전남진흥원내의 망초에 기생하는 진딧물(*Dactynotus* sp.)에서 발견하였다. 이에 국내에서 처음으로 *Z. phalloides*를 보고하며, 형태적 특징을 기재한다. 이 균은 소세지 모양의 1차포자를 형성하는 것이 특징이며, 평균길이가 28.98 μm이었다. 또한 1차포자에서는 두 종류의 2차 분생자병을 형성하였는데, 발아관처럼 짧고 굵거나 긴 막대모양을 띄었고, 각각의 분생자병 끝에서 2차포자가 만들어졌다.

References

Ben-Ze'ev, I. and Kenneth, R. G. 1982. Features criteria of taxonomic value in the Entomophthorales: II. A revision of the genus *Erynia* Nowalowski 1881 (=*Zoophthora* Batko 1964). *Mycotaxon* **14**: 456-475.

Glare, T. R., Milner, R. J., Chilvers, G. A., Mahon, R. J. and Brown, W. V. 1987. Taxonomic implications of intraspecific variation amongst isolates of the aphid-pathogenic fungi *Zoophthora radicans* Brefeld and *Z. phalloides* Batko (Zygomycetes: Entomophthoraceae). *Aust. J. Bot.* **35**: 49-67.

Milner, R. J., Teakle, R. E., Lutton, G. G. and Dare F. M. 1980. Pathogens (Phycomycetes: Entomophthoraceae) of the blue-green aphid *Acyrthosiphon kondoi* Shinji and other aphids in Australia. *Aust. J. Bot.* **28**: 601-619.