

First Record of the Entomopathogenic Fungus *Neozygites fresenii* on the Aphid in Korea

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국내 미기록 진딧물병원성 곰팡이 *Neozygites fresenii*에 관한 보고

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ABSTRACT: *Neozygites fresenii* (Zygomycetes: Entomophthorales), aphid-attacking fungus, was found in June 1998 for the first time in Korea. The fungus produces the globose primary conidia with a truncate papillar and two types of the secondary conidiophores and conidia. Resting spores were not found in our specimens, but the fungal structures observed clearly distinguish the fungus from other aphid-attacking fungi, allowing inclusion in the species *N. fresenii*.

KEYWORDS: Entomopathogenic fungus, *Neozygites fresenii*, *Dactynotus* species

A number of dead aphids were noticed in small populations of the *Dactynotus* species (Homoptera: Aphididae) on the horseweeds at National Institute of Agricultural Science and Technology (NIAST). A close examination revealed an entomophthorosis, with conidial stage present. Dead cadavers were collected, and prepared for microscopic examination on glass slides in a drop of lactophenol by heating them gently. The entomophthoraceous fungus was identified on the basis of anamorphic characteristics.

Our microscopic examination identified the fungus as *Neozygites fresenii* (Nowakowski) Remaudière & Keller (Zygomycetes: Entomophthorales), which has never been recorded in Korea. The shape and dimensions of the primary conidia observed in our specimens were perfectly matched with those of *N. fresenii* described by other studies (Humber, 1989; MacLeod and Müller-Kögler, 1973; Remaudière and Keller, 1980). Despite numerous attempts to grow *N. fresenii* on various artificial media, this fungus has not been isolated and cultured apart from its natural host (MacLeod and Müller-Kögler, 1973). Herein, anamorphic appearance of the fungus, first observed in Korea, was described and illustrated on the basis of the collected specimens.

Descriptions

Neozygites fresenii (Nowakowski) Remaudière & Keller,

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Mycotaxon 11: 332, 1980.

= *Empusa fresenii* Nowakowski, Pamiętn. Wyd. Akad. Umiej. w. Kraków 8: 17, 1883

= *Neozygites aphidis* Wiltaczil, Archiv für mikroskopische Anatomie 24: 599, 1885

≡ *Triplosporium fresenii* Batko, Bull. Acad. Polon. Sci., cl II, Ser. Biol. 12: 324

Aphid cadavers killed by *N. fresenii* are grey in colour, and characteristically hang from the stems and underside of leaves of the horseweeds by the proboscis inserted in the plant tissues (Fig. 1A). Conidiophores are determinate, simple, variable in length, developing directly from the hyphal bodies (Fig. 1B). As the conidiophores cover the entire body of the host, its surface becomes grey in colour. The primary conidia are subglobose to globose (15-19.5 $\mu\text{m} \times 11.5-16.5 \mu\text{m}$) with a very short stalk-like, truncate base, and weakly discharged by papillar eversion (Fig. 1C). The primary conidia of *N. fresenii* germinate in two ways: by producing a short broad conidiophore from which secondary conidium is forcibly ejected (Fig. 1D), or by producing a long slender conidiophore which obliquely bears capilliconidium (Fig. 1E). The forcibly ejecting secondary conidia could not be distinguished due to similar shape with the primaries. However, short broad conidiophores on the primaries indicated production of the secondary conidia. The capilliconidia are almond-shaped (13-18.5 $\mu\text{m} \times 9-12 \mu\text{m}$), asymmetrical with terminal mucoid hapteron on short peg-like extension, and passively

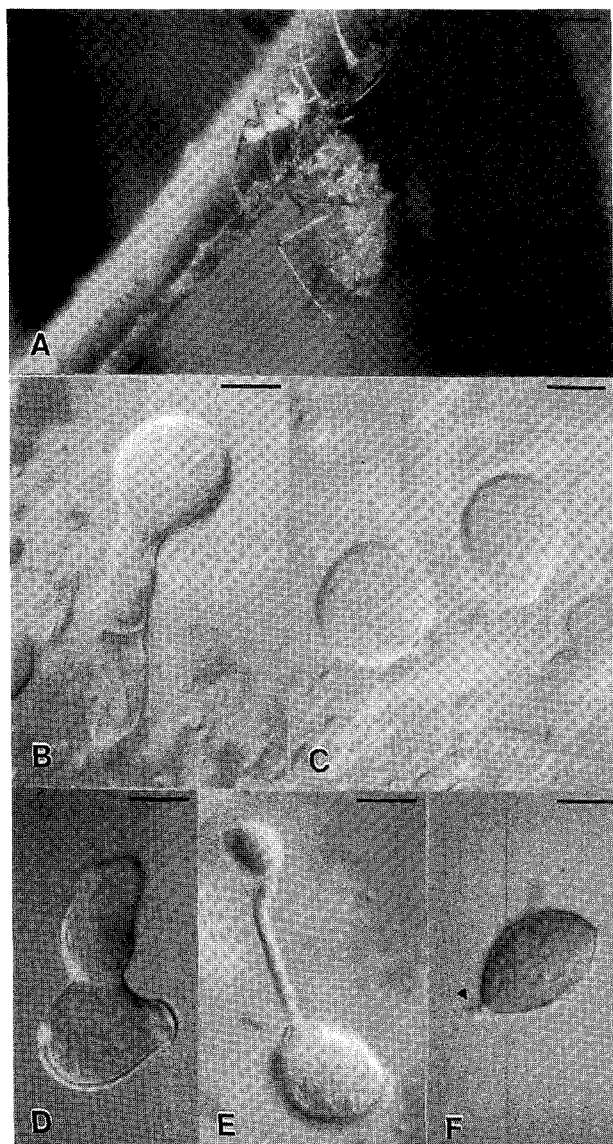


Fig. 1. (A) Aphid cadaver killed by *Neozygites fresenii*. Bar=100 μm . (B) Conidiophore bearing primary conidium. (C) Primary conidia with a very short stalk-like, truncate base. Bar=10 μm . (D) Germinating primary conidium by producing a short broad secondary conidiophore. Bar=10 μm . (E) Primary conidium with a long slender secondary conidiophore which obliquely bears capilliconidium. Bar=10 μm . (F) Almond-shaped capilliconidium with apical slime drop (haptor; arrow). Bar=10 μm .

dispersed from capillary conidiophores (Fig. 1F). All spore types are pale grey to smoky grey to dark brown. Rhizoids and pseudocystidia are absent. Resting spores

were not observed in our specimen.

Host: Aphid (Homoptera: Aphididae) especially species of the genus *Dactynotus*.

Location: On June 1998 at National Institute of Agricultural Science and Technology (NIAST), Suwon, Korea.

Note: In the light of these observations, the globose primary conidia with a truncate papillar and two types of the secondary conidiophores and conidia clearly distinguish this species from other aphid-attacking fungi, allowing inclusion in the species *N. fresenii*. This species is a widely occurring fungal pathogen of aphids, and has been considered as an important natural control agent (Gustafsson, 1965). However, as it has never been cultivated *in vitro*, its potential as a mycoinsecticide is limited until development of a medium for this fungus.

적 요

국내 미기록 진딧물병원성 곰팡이, *Neozygites fresenii*를 1998년 6월경 수원 농업과학기술원내의 망초에 서식하는 진딧물(*Dactynotus* sp.)에서 발견하였다. 이에 국내에서 처음으로 *N. fresenii*를 보고하며, 형태적 특성을 기재한다. 이 균은 짧은 papillar를 지닌 둥근 모양의 1차 포자를 형성하며, 1차 포자로부터 두 종류의 2차 분생자병을 형성하는 것이 가장 큰 특징이었다. 짧고 굵은 2차 분생자병에서는 1차 포자와 유사한 2차 포자가 생성되었으며, 가늘고 긴 분생자병에서는 아몬드 모양의 포자가 형성되었다.

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