

New Arrowhead (*Sagittaria trifolia*) Disease Caused by *Plectosporium tabacinum* in Korea

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*Plectosporium tabacinum*에 의한 벼풀마름병(가칭)의 발생

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ABSTRACT: A new disease of arrowhead (*Sagittaria trifolia* L.) caused by *Plectosporium tabacinum* was observed at Yusung area in Korea. Infection occurred on the petioles, leaves, and seeds of young and old arrowhead plants. Small and brown spots developed on the infected areas initially, which later coalesced to form large dead areas resulting in the complete blight of the host plant. Inoculation of arrowhead seedlings by conidial suspension induced typical disease symptoms found in naturally infected plants. The new name for the disease 'arrowhead blight' is suggested. The pathogenic fungus was identified as *Plectosporium tabacinum* and its morphological and cultural characteristics are described.

Key words: arrowhead, rice weed, *Plectosporium tabacinum*.

Arrowhead (*Sagittaria trifolia* L.) is a monocotyledonous perennial plant in the family of Alismataceae. During the last decade it has become a troublesome weed in rice (*Oryza sativa* L.) paddies throughout Korea and Japan, because no effective herbicides are available due to the resistance problem and also because of irregular emergence of arrowhead throughout the growing season (3). Chung *et al.* reported a new disease of arrowhead caused by *Acremonium* species and evaluated the fungus as a potential mycoherbicide in a growth chamber and field tests (1). Leaf spot of arrowhead similar to this disease was also found in Taiwan and its pathogen was identified as *Cylindrocarpon chiayiense* (5). The disease was endemic among young and old arrowhead plants from June to October in paddy fields of Korea Research Institute of Chemical Technology at Yusung area in 1990. Infection occurred on the leaves, seeds, and petioles of arrowhead and small, brown spots developed on the infected areas initially and as they enlarged later they coalesced to form large dead areas resulting in the complete blight of the host plant (Fig. 1). Petiole infection frequently induced very quick defoliation within a day

under the hot and humid conditions. The new name for the disease 'arrowhead blight' is suggested.

The pathogenic fungus tentatively identified as *Acremonium* species has been reidentified as *Plectosporium tabacinum* and confirmed by Dr. W. Gams at Centraalbureau voor Schimmelcultures, the Netherlands (2). Palm *et al.* described *Plectosporium* as a new genus for *Fusarium tabacinum*, the anamorph of *Plectosphaerella cucumerina* (4). In this paper, the fungus is described and illustrated (Fig. 2). The reverse side of colony on potato dextrose agar (PDA) and malt extract agar (MA) were white to pale grey-brown, sometimes slightly orange or light purplish, translucent, moist, loosely cottony, with irregularly raised center, radially sulcate, moderately slow growing and attained a diameter of 40 mm after 10 days at 20°C, 46 mm at 25°C with abundant sporulation. Colonies on oatmeal agar were white, flat. Colony reverse was white to greyish brown, sometimes light purple. Vegetative hyphae were hyaline, septate, smooth-walled and 1.5~2.7 µm wide. Conidiogenous cells were monophialidic, arising solitarily from aerial hyphae, numerous, discrete, lateral, orthotropic, cylindrical attenuating gradually toward the apex, hyaline, smooth, determinate, variable in length, 12~38 µm long, 2~2.5 µm wide at

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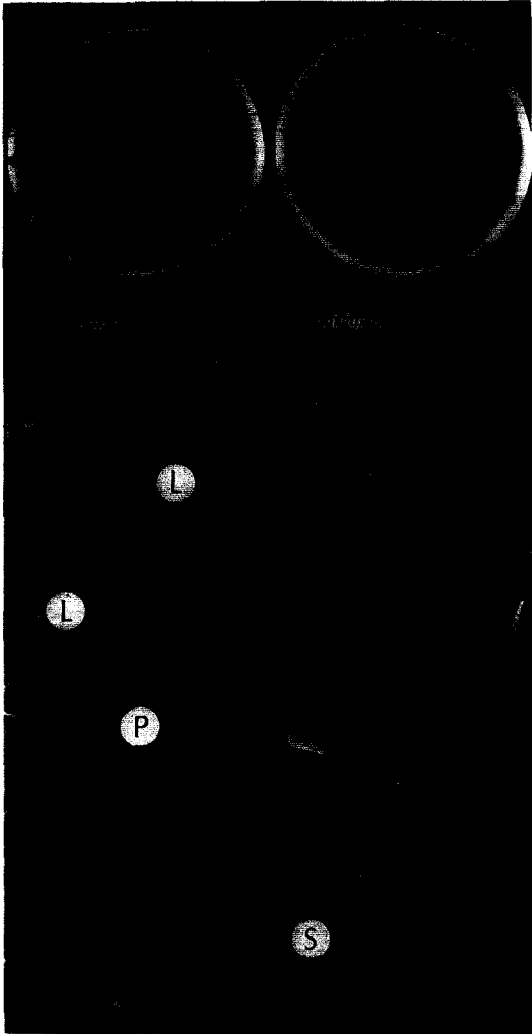


Fig. 1. Disease symptoms on leaves (L), petioles (P), and seeds (S) of naturally infected arrowhead (below). Two arrowhead seedlings (*Sagittaria trifolia*, *S. pygmaea*) showing typical symptoms following artificial inoculation with *Plectosporium tabacinum* (upper).

the base and 1~1.5 μm wide at the extreme apex. Conidia were 0 to 1-septate, oblong, obtuse at the base and apex, hyaline, smooth, thin-walled, 5~12 \times 2.5~4.5 μm and borne singly at the apex of the conidiogenous cells.

요 약

다년생 논잡초인 벼풀에 마름증상을 일으키는 병이 1990년 여름, 대전 한국화학연구소 시험포장에서 발생되었다. 감염초기에는 벼풀 엽병부분이 먼저 시들

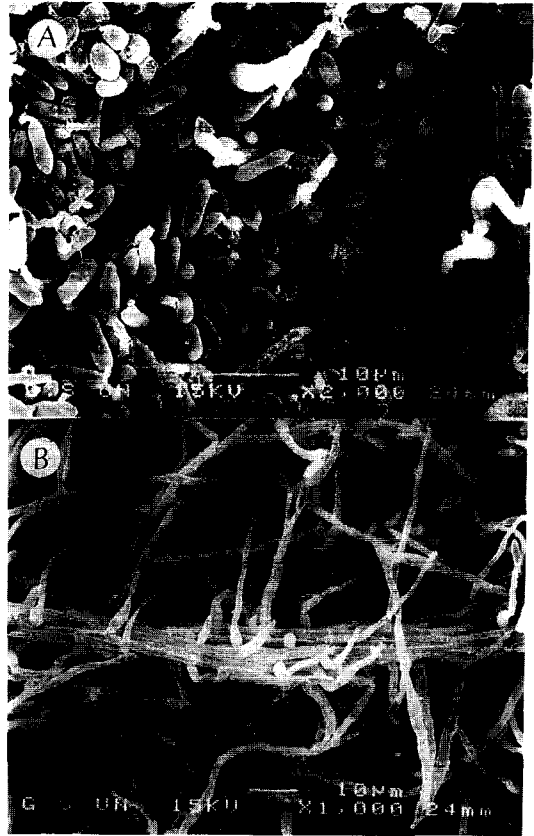


Fig. 2. Conidia (A), conidiophores and phialides (B) of *Plectosporium tabacinum* from 10-day-old culture on potato dextrose agar under SEM.

고 이어서 잎 전체가 말라 비틀어지는 증상을 보였으며 잎, 줄기, 종자 모든 부분이 병균에 의해 감염되었다. 이병 부위에서 병원균을 분리하여 재접종한 결과 포장에서와 동일한 병징이 나타났으며, 특히 고온 다습한 상태에서는 포자 접종 후 8시간 이내에 기주식물이 완전히 시들었다. 이 병을 '벼풀 마름병'으로 제안하며, 분리된 병원균은 형태, 생리학적 실험 결과 *Plectosporium tabacinum*으로 동정되었다. 이 병원균의 최적 생장온도는 25~30 $^{\circ}\text{C}$ 이었고, 생장속도가 25 $^{\circ}\text{C}$ 에서 10일 동안 균총직경이 46 mm로 비교적 생장속도가 늦었다. 균총표면은 고운 솜털이 깔린 것 같거나 배지에 따라 점액성을 보이기도 하며, 균주에 따라 불규칙한 주름이 형성되기도 하였고, 균총색깔은 옅은 회갈색 또는 오렌지색이었다. 포자는 PDA와 같은 일반생장 배지에서 많이 형성되었으며, 분생포자경에 하나씩 형성되었고, 크기는 5~12 \times 2.5~4.5 μm , 격막은 없거나 1개 있었다.

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