

Blue Mold of Pear Caused by *Penicillium aurantiogriseum* in Korea

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The isolation of a causal pathogen from pear fruits showing lesions of blue mold was carried out, which were preserved in the packinghouse of Anseong for the export to the United States. When the lesion of pears (*Pyrus pyrifolia* Niitaka) was checked in packinghouse, their fruit epidermis over decayed parts varied from light tan to dark brown. Also, the decayed flesh was soft and watery, and separated easily from the healthy tissue. Based on the cultural and morphological characteristics, the fungus (IL-12 isolate) was identified as *Penicillium aurantiogriseum*. This is the first report associated with blue mold of pear caused by *P. aurantiogriseum* in Korea.

KEYWORDS: Blue mold, Pear, *Penicillium aurantiogriseum*

Blue mold, known as soft rot or wet rot, has been reported as one of the most important postharvest diseases of apples or pears in the United States (Jones and Aldwinkle, 1991). A good diagnostic for blue mold is the characteristic earthy, musty odor associated with the decay. The fruit epidermis over decayed parts varies from light tan to dark brown. The decayed flesh is soft and watery, and separates easily from the healthy tissue (Jones and Aldwinkle, 1991; Lee *et al.*, 1997). At least 11 species of *Penicillium* have been reported to be isolated from naturally infected pome fruits (such as apples or pears) with blue mold in the United States (Jones and Aldwinkle, 1991). Of 11 species, *Penicillium aurantiogriseum* has been known to cause blue mold of apples and pears during the storage period (Borecka, 1977; Jones and Aldwinkle, 1991). Except for *P. aurantiogriseum*, another pathogens causing blue mold of pears have been known as *P. crustosum*, *P. expansum*, and *P. puberulum* (Jones and Aldwinkle, 1991). Though *P. aurantiogriseum* has been reported to cause blue mold of apples and pears in the United States, there are still no reports associated with *P. aurantiogriseum* causing blue mold of apple or pear in Korea. From October to November in 2000, this study was carried out to check fruits showing lesions of blue mold in the packinghouse of Anseong for the export to the United States. When the lesion of pears (*Pyrus pyrifolia* Niitaka) was checked in packinghouse, their fruit epidermis over decayed parts varied from light tan to dark brown (Fig. 1A). The decayed flesh was not only soft and watery but also separated easily from the healthy

tissue (Fig. 1A). Also, the tufts of bluish or blue-green spores appeared on the surface of the decay or along the edges of wounds (Fig. 1A). Three to 5 mm sized lesion pieces were cut from the surface of pear, and incubated on 2% water agar after surface-sterilizing with 1% sodium hypochlorite solution for 1 min. The fungus (IL-12 isolate) was isolated from the pieces on 2% Water agar, and transferred to potato dextrose agar (PDA) or malt extract agar. For the identification, the fungus (IL-12 isolate) was incubated at 25°C. Based on the cultural and morphological characteristics (Fig. 1 and Table 1), the fungus (IL-12 isolate) was identified as *Penicillium aurantiogriseum*. When the isolate (IL-12) was incubated on malt extract agar, it showed a dense mycelial growth with blue-green conidia on the center of colony (Fig. 1B). As described on Fig. 1C and Table 1, hyphae of *P. aurantiogriseum* were septate with branched conidiophores. Penicilli type of branched conidiophores was commonly biverticillate. Metulae supporting the tufts of phialides were measured in the range of 15–23 µm, whereas rami were 10–15 µm in length. The phialides on metula were slender, ampulliform types in shape, and the sizes of phialides were measured in the range of 8–13 µm long. The walls of conidiophores were smooth to roughened types in appearance. Conidia were spherical to subspherical in shape with smooth walls and measured in the range of 3–5 µm in diameter. The cultural and morphological characteristics of fungus (IL-12 isolate) were similar to the descriptions of previous workers (Woodagawa, 1977; Pitt, 1985; Jones and Aldwinkle, 1991). Fungus (IL-12 isolate) was used for pathogenicity test on healthy fruits of pear using conidial suspensions ($6\sim 8 \times 10^3$ conidia/ml). All

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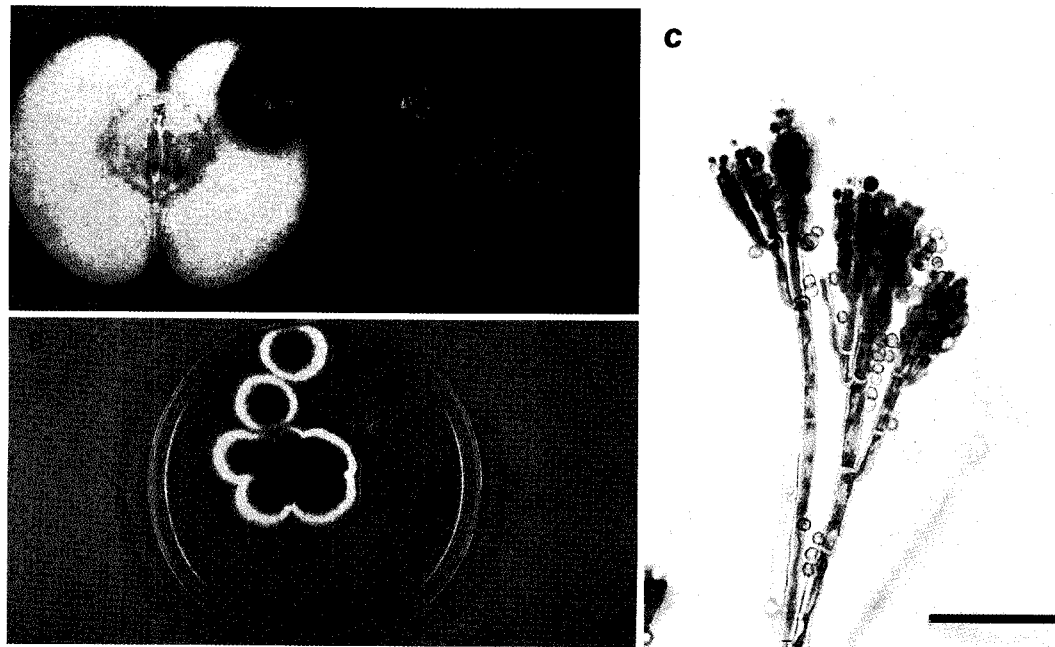


Fig. 1. Symptoms of blue mold on pear fruit and cultural and morphological characteristics of *Penicillium aurantiigriseum*. (A) An external and internal symptom of infected fruits caused by *P. aurantiigriseum*. (B) Colony of *P. aurantiigriseum* on malt extract agar (C) Conidia, phialides and matulae of *P. aurantiigriseum* (Scale bar represents 30 μm).

Table 1. Morphological characteristics of *Penicillium aurantiigriseum* IL-12 isolate

Character	IL-12 isolate	<i>Penicillium aurantiigriseum</i> ^a
Conidiophores		
penicilli type	commonly biverticillate	commonly biverticillate
rami	15~23 μm long	15~25 μm long
metulae	10~15 μm long	10~15 μm long
phialides		
shape	slender, ampulliform	slender, ampulliform
size	8~13 μm long	mostly 7~10 μm long
wall	smooth to roughened	smooth to finely roughened
Conidia		
shape	spherical to subspherical	spherical to subspherical
size	3~5 μm diameter	usually 3~4 μm diameter
wall	smooth	smooth

^aThe identification was referred to isolates on the basis of reference of Pitt (1985).

the epidermal tissues of inoculated fruits showed soft and watery symptoms, and the symptoms were the same as those of infected fruits observed in packinghouse. Also, the fungus was reisolated from lesions of inoculated fruits and tested to compare its characteristics with those of fungus identified previously. This is the first report associated with blue mold of pear caused by *P. aurantiigriseum* in Korea.

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