Botrytis disease of kiwifruit in Turkey

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Abstract. Botrytis cinerea infection of kiwifruit was reported for the first time from Rize, Turkey. The pathogen caused leaf blights. It is found in Rize central district, Ardeşen, Pazar, Çayeli, Fındıkli and Güneysu districts. Isolates were confirmed to be B. cinerea using polymerase chain reaction with specific primers C729\textsuperscript{+} that amplified a 700 bp fragment.

Introduction

Botrytis cinerea and other Botrytis species are important pathogens of numerous plants including vegetables, orchard crops, ornamental plants and stored agricultural products (Jarvis 1977; Elad et al. 2007). Botrytis cinerea is a common fungus and damages flowers, leaves, stems, fruit and other parts of many plants (Ellis 1971) including kiwifruit (Actinidia delicosa hybrids). This pathogen causes stem end rot of kiwifruit which is commonly observed in storage facilities (Brook 1991; Manning and Lallu 1997; Michailides and Elmer 2000). Pennycook (1985) also reported B. cinerea affecting harvested fruit during cold storage. Botrytis sp. from kiwifruit fruit rot was reported from Korea (Koh et al. 2003). Botrytis cinerea was also reported from Italy (Bisiach et al. 1984), USA, New Zealand (Michailides and Elmer 2000) and Japan (Ieki 1993). Although B. cinerea is most often reported as a storage disease, it has a preharvest component and affects green leaves, flower parts and senescent or dead plant parts (Brook 1991; Michailides and Elmer 2000).

Kiwifruit was first introduced to Turkey in 1988. The Eastern Black Sea Region is particularly suitable for kiwifruit growing and an increasing number of kiwifruit growing areas are being established there (Yağlı et al. 1998). Rize Province of Turkey is becoming an important kiwifruit growing region. This study reports the first finding of Botrytis grey mould in kiwifruit in Turkey.

Materials and methods

Surveys were conducted in Rize Province of Turkey for the presence of Botrytis cinerea in kiwifruit orchards. Thirty-three kiwifruit orchards in Rize central, Çayeli, Pazar, Fındıkli, Iyidere, Çamlıhemşin, Derepazarı, Ardeşen and Güneysu districts were surveyed in autumn 2007 and 32 kiwifruit orchards in Rize central, Çayeli, Fındıkli, Derepazarı, Ardeşen and Pazar districts were surveyed in autumn 2008. Diseased leaves were collected from kiwifruit growing areas, surface-sterilised with 1% NaOCl for 1 min and placed into Petri plates containing potato dextrose agar (PDA). Morphological and molecular characterisation studies were carried out in order to identify Botrytis cinerea.

For molecular characterisation of the isolates, DNA was extracted from all B. cinerea isolates according to the method of Lee and Taylor (1990). Isolates were cultivated on PDA medium for 7 days at 23 ± 1°C. Mycelia were collected from the surface of PDA medium by scraping with a sterile spatula and disrupted in an extraction buffer. Polymerase chain reaction (PCR) analysis was performed according to the method of Rigotti et al. (2002) with primers C\textsuperscript{729}± (C\textsuperscript{729}+: 5\textsuperscript{-}-AGCTCGAGAGAGATCTCTGA-3\textsuperscript{-}); C\textsuperscript{729}−: 5\textsuperscript{-}-CTGCAATGTTCTGCGTGAA-3\textsuperscript{-}). The PCR products were separated electrophoretically in 1.4% agarose gels using TRIS-acetate-ethylenediaminetetra-acetic acid (EDTA) (TAE) buffer and visualised under UV light after staining with ethidium bromide (Sambrook et al. 1989).

Pathogenicity tests were performed in a controlled growth room with a 18/23°C night/day temperature regime. The relative humidity of the controlled growth room ranged between 65% and 85% during the experimental period. Pathogenicity studies were performed with 2-year-old kiwifruit plants cv. Hayward. Mycelial plugs, 0.5 cm in diameter, taken from a 10 day-old B. cinerea culture were placed on the fully expanded kiwifruit leaves and removed 1 week later. In control treatments only sterile agar plugs were used. The leaves were misted three times each day for 3 days.

Results and discussion

In both survey years Botrytis cinerea was isolated from leaves showing leaf blight symptoms. Botrytis cinerea species-specific PCR using C\textsuperscript{729}± primer set, amplified the expected 700-bp DNA fragment from isolates tested. A total of 17 Botrytis cinerea isolates were obtained in 2007 from Rize central, Ardeşen, Pazar, Çayeli, Fındıkli and Güneysu districts. Fourteen isolates were obtained in 2008 from Ardeşen, Fındıkli, Pazar and Çayeli districts. The disease was not common and only leaf blight symptoms were observed. Leaf blights consisted of reddish brown, brown and grey leaf areas (Fig. 1). B. cinerea formed whitish grey colonies which later turned greener/snow greyish brown with age and abundant sclerotia were developed.
The fungus produced abundant conidia, conidiophores, and sclerotia in PDA. Conidia were single-celled, ovoid, ellipsoid, globose, colorless to pale brown, smooth and measured 5.5–10 × 7.5–13.3 μm. Ellis (1971) reported conidial dimensions as 6–9 × 8–14 μm. Most of the isolates produced black sclerotia in PDA. Sclerotial measurements ranged between 1–10 mm. However, the majority of the sclerotia ranged between 1–5 mm. Ellis (1971) reported the production, size and shape of the sclerotia of Botrytis cinerea as extremely variable.

In the pathogenicity study, disease development started on the 5th day. At the end of the 8th day, a 3-cm diameter, water-soaked, grey area developed at the inoculation point. Botrytis cinerea was reisolated from the diseased regions. No disease was observed with the control plants.

Botrytis cinerea was observed causing leaf blights in kiwifruit orchards in Rize, Turkey. This pathogen also causes stem end rot of kiwifruit which is commonly observed in storage facilities in other countries (Brook 1991; Manning and Lallu 1997; Michailides and Elmer 2000). Storage facilities in Turkey should be checked for the presence of this disease.

To the best of our knowledge, this is the first report of Botrytis cinerea causing disease in kiwifruit in Turkey. Although the disease was not observed commonly during the surveys, attention should be exercised due to the nature of the pathogen and biology of the pathogen should be studied in detail.

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References