The occurrence of *Anthostoma decipiens*, the causal agent of 'Carpinus betulus decline', in northern Iran

M. Mirabolfathy 1,*, A. Javadi 2 and S. Peighami Ashnaei 1

1 Plant Disease Research Department, Iranian Research Institute of Plant Protection, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran.; 2 Botany Research Department, Iranian Research Institute of Plant Protection, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran

*E-mail: mirmirabolfathy2000@yahoo.com

Received: 13 Jan 2018. Published: 11 May 2018. Keywords: hornbeam, fungal plant disease

*Carpinus betulus* (hornbeam) is a native tree growing in the Hylcanian forests of northern Iran. Recently there have been increasing reports of hornbeam decline in this region. In 2014, we received, for the first time, reports of decline from Saad Abad Naharkhoran in the west of Golestan province. Subsequently symptoms of disease were observed in Koohmian and Daland forests during summer and autumn of that year (Fig. 1). Since then the disease has spread throughout the area, especially during the last summer (2017), when trees were subjected to a long period (50-60 days) of high temperatures (38-40°C) and drought conditions. Losses due to the decline were estimated to be about 10% in autumn. The infected trees showed large cankers with bright red resin-like clumps of conidia on the bark of the trunks and main branches (Fig. 2).

The red conidial masses were collected and transferred to the laboratory for fungus isolation. A transverse section of the infected tissues showed long colonies grown on malt agar.

The occurrence of *Anthostoma decipiens* (teleomorph *Cytospora decipiens*) (Rappaz, 1992). In order to confirm the identity of the fungus, DNA was extracted and restriction fragments amplified using PCR. Total DNA was extracted from pure culture of 14 samples using the method described by Barnes et al. (2001). The characteristics of isolates were studied based on PCR amplification of the ITS region of rDNA, using ITS5 (forward) 5′-(GGAAGTAAAAGTCGTAACAAGG)-3′ and ITS4 (reverse) 5′-(TCCTCCGCTTATTGATATGC)-3′ universal primers. BLAST searches of the GenBank nucleotide database revealed 99% identity to *A. decipiens* (Genbank Accession No. KC774565) (Jaklitsch et al., 2014). The sequence of *A. decipiens* isolate CBIR was deposited in Genbank (MG738274).

Pathogenicity tests were conducted on nine replicates of one-year-old hornbeam saplings, replanted in 3 l pots containing sterilised forest soil. The plugs were placed under the bark of stem wounds and wrapped with a piece of moistened, sterilised cotton and plastic film. Five saplings were used as control plants. These were inoculated in the greenhouse and monitored for symptom development. After 30 days, 2-3 cm lesions appeared on the fungus-inoculated samples and the same fungus was re-isolated. No symptoms were observed on the controls.

It is thought that the spread of hornbeam decline caused by *A. decipiens* has accelerated during the last few years due to drought conditions and the warmer summers experienced in the Golestan forest region. Indeed, it has been suggested that climate change has also played a critical role in the spread of hornbeam decline in the different regions of Italy (Rocchi et al., 2010; Saracchi et al., 2015). This is the first report of *Carpinus betulus decline* caused by *A. decipiens* in Iran. However, reviewing the literature, there appears to be little information on the biology, host range and disease epidemiology of the fungus. Given this lack of information, as well as the possible importance of climate change in disease development, it is clear that this disease warrants further study.

References


http://dx.doi.org/10.1094/PDIS.2001.85.3.317


http://dx.doi.org/10.3767/003158514X679227


http://dx.doi.org/10.4454/JPP.V97H1.013