New Disease Reports

First report of *Gnomoniopsis smithogilvyi* causing lesions and cankers of sweet chestnut in the United Kingdom

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In late summer 2016 cankers and shoot dieback were detected on a sweet chestnut (*Castanea sativa*) tree (Figs. 1-2) during a survey for chestnut blight (*Cryphonectria parastica*) in southeast England. The tree was part of a two-year-old amenity planting scheme. Samples of the affected shoots were sent to the Tree Health Diagnostic and Advisory Service at Forest Research for examination. Isolations were made from the margin of the lesion and plated onto malt agar amended with 1% streptomycin, and the plates incubated for 4 days at 20°C in the dark. A fungus grew consistently from the affected tissues and growing colonies were transferred to 2% potato dextrose agar (PDA) and incubated further. The fungus formed a white fluffy colony on PDA after seven days (Fig. 3) and readily produced hyaline, fusoid, obovoid and multi-gutulate conidia which were straight or slightly curved (without appendages) after 14 days. Spore dimensions were 5-7.5 µm x 1.25-2.5 µm. DNA was extracted from mycelium and the ITS region was amplified and sequenced with the primers ITS1 and ITS4. Based on morphological features and ITS sequences the identity of the fungus was confirmed as *Gnomoniopsis smithogilvyi* (Shuttleworth *et al*., 2012). The sequences of the ITS showed 100% identity with sequences of *G. smithogilvyi* deposited in GenBank and a representative sequence was submitted to GenBank (Accession No. KY695232).

Pathogenicity tests were done by inoculating six three-year-old sweet chestnut saplings. Following surface sterilisation, a wound was made on the stem 10 cm above soil level using a sterilised 5 mm cork borer. A 5 mm diameter mycelial plug taken from a month-old colony of *G. smithogilvyi* was inserted into the wound which was covered with moistened cotton and wrapped with paraffin film and then aluminium foil. Six control sweet chestnut saplings were inoculated with sterile agar plugs. Saplings were kept in a growth chamber and maintained at 20°C with a 12 hr photoperiod. After four weeks, necrotic lesions were observed only on the inoculated saplings and the fungus was consistently reisolated from all lesions (Fig. 4). Control saplings, however, were asymptomatic and no *G. smithogilvyi* was recovered from them. The identity was confirmed by morphology and by sequencing of the ITS region.

Gnomoniopsis smithogilvyi (syn. *G. castaneae*) has been identified as the causal agent of chestnut rot in sweet chestnut in Australia and Italy (Shuttleworth *et al*., 2012; Visentin *et al*., 2012). Subsequently, it has been found causing cankers on shoots and scions in India (Dar & Rai, 2015) and most recently causing cankers on sweet chestnut in Switzerland (Pasche *et al*., 2016). The fungus has also been reported as an endophyte (Visentin *et al*., 2012) and saprobe (Shuttleworth *et al*., 2015) of sweet chestnut.

This is the first report of *G. smithogilvyi* causing cankers on sweet chestnut in the wider environment in the UK. The level of threat that it poses to this host in the UK is uncertain. Following this finding, *Gnomoniopsis* sp. that had been recovered from sweet chestnut trees between 2011-2013 in the UK from chestnut orchards, a nursery and private residences were also identified as *G. smithogilvyi*. The most recent finding appears to be unconnected with the earlier records.

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References

Dar MA, Rai MK, 2015. *Gnomoniopsis smithogilvyi* a canker causing pathogen on *Castanea sativa*: First report. *Mycosphere* **6**, 327-336.

Pasche S, Calmin G, Auderset G, Crovadore J, Pelleteret P, Mauch-Mani B, Barja F, Paul B, Jermini M, Lefort F, 2016. *Gnomoniopsis smithogilvyi* causes chestnut canker symptoms in *Castanea sativa* shoots in Switzerland. *Fungal Genetics and Biology* **87**, 9-21. http://dx.doi.org/10.1016/j.fgb.2016.01.002

Shuttleworth LA, Guest DI, Liew ECY, 2012. Fungal Planet description sheet 108: *Gnomoniopsis smithogilvyi* L.A. Shuttleworth, E.C.Y. Liew & D.I. Guest, sp. nov. *Persoonia* **28**, 142-143. http://dx.doi.org/10.3767/003158512X652633

Shuttleworth LA, Walker DM, Guest DI, 2015.The chestnut pathogen *Gnomoniopsis smithogilvyi* (Gnomoniaceae, Diaporthales) and its synonyms. *Mycotaxon* **130**, 929-940. http://dx.doi.org/10.5248/130.929

Visentin I, Gentile S, Valentino D, Gonthier P, Tamietti G, Cardinale F, 2012. *Gnomoniopsis castanea* sp. nov. (Gnomoniaceae, Diaporthales) as the causal agent of nut rot in sweet chestnut. *Journal of Plant Pathology* **94**, 411-419. http://dx.doi.org/10.4454/JPP.FA.2012.045

Figure 1

Figure 2

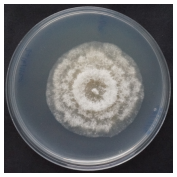

Figure 3

Figure 4

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