New Disease Reports

# *Rhizoctonia solani* AG3-PT infecting maize stem bases and roots in the United Kingdom

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*Rhizoctonia solani* is an important pathogen of potatoes. The fungus is comprised of 13 anastomosis groups (AGs) of which AG3-PT (the potato subgroup) is most closely associated with potatoes (Tsror, 2010). Maize plants (cv. Ballade) and soil were sampled from a maize field in Shropshire in June 2012. Brown lesions were observed on the roots and stem bases of four plants. From one affected plant, pure *Rhizoctonia solani* cultures were obtained as described in Woodhall *et al.* (2007). These were identified as AG3-PT using real-time PCR (Woodhall *et al*., 2013).

A controlled environment experiment was undertaken to satisfy Koch's postulates. The isolate was grown on potato dextrose agar at 20°C in 100 mm diameter petri dishes. After two weeks, six fully colonised plates were macerated using a scalpel and added to 1 kg of silver sand. Fifty grams of this mixture was mixed with 450 g of John Innes No. 2 and added to each pot. Three, one-week-old, maize seedlings (cv. Sweet Nugget) were transferred into the inoculated compost. Maize seedlings were also transferred to non-inoculated pots. Each treatment was replicated five times. Pots were placed in a controlled environment room (ambient humidity and 12h/12h light/dark photoperiod) at 8°C for two weeks, to simulate conditions at planting. After two weeks, the temperature was raised to 20°C. The plants were allowed to grow for a further three weeks, after which they were washed and assessed for disease. Stem base browning was observed in nine of the 15 plants inoculated. No browning was observed on any of the non-inoculated control plants. Twenty pieces of plant material with symptoms were plated on 2% tap water agar, from which AG3-PT (as confirmed by real-time PCR) was re-isolated from 50% of attempted isolations, thereby satisfying Koch's postulates.

Quantification of AG3-PT (using real-time PCR) from soil samples taken from the site in Shropshire revealed a potential interaction between maize and AG3-PT. Soil was taken from nine 30 $m^2$ plots over the field, one plot including the affected maize plants. DNA was extracted from 250 g of soil as described in Woodhall *et al.* (2012). In soil taken from the same plot as the affected maize plants, levels of AG3-PT DNA were determined to be 3501 pg DNA/g soil. In the other eight plots levels of AG3-PT were determined to be 40 pg DNA/g soil (range 0 to 183, SD = 74). Levels of AG3-PT in soil were therefore higher in the area of the affected maize plants.

To the authors' knowledge, this is the first report of AG3-PT infecting maize in the UK. AG3-PT has only been found previously in the UK on potatoes (Woodhall *et al.*, 2007) but has been found in several crop and weed hosts worldwide (Tsror, 2010). In pathogenicity tests, maize has been found to be susceptible to AG3 infection along with other cereal crops such as wheat and oats (Carling *et al*., 1986). In this study, soil levels of AG3-PT appear to increase within the vicinity of infected maize plants; therefore maize may provide a suitable alternative host for *R. solani* (AG3-PT) and potentially increase the risk of disease in subsequent potato crops.

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