



First report of *Alternaria tomatophila* and *A. grandis* causing early blight on tomato and potato in Brazil

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Strong population subdivision according to the host was revealed in a study designed to assess the genetic variability of *Alternaria solani* on potato (*Solanum tuberosum*) and tomato (*S. lycopersicum*) in Brazil (Lourenço Jr. *et al.*, 2009). We hypothesised that more than one species cause early blight disease on these hosts. We analysed 19 isolates obtained from potato and nine from tomato, sampled from 2005 to 2008 from seven geographic regions. Ex-type and authentic isolates of *A. tomatophila* (EGS 42-156), *A. grandis* (EGS 44-106 and 44-108), and a representative isolate of *A. solani* (EGS 44-098) were used for comparison (Simmons, 2000). Based on morphological characteristics all isolates from tomato were identified as *A. tomatophila* and those from potato as *A. grandis* (Simmons, 2007) (Fig. 1; Table 1). *A. solani* was not detected in the samples. A preliminary report has been previously published (Rodrigues & Mizubuti, 2009).

The pathogenicity of three isolates from tomato and five from potato were tested on susceptible plants in cross inoculation assays. Two drops of a 10⁴ conidia/ml suspension were placed on five leaflets in each plant (six plants/isolate). The lesion diameter (mm) was determined using a digital caliper and the formula of the area of a circle was used to estimate the lesion area (LA) four days after inoculation. On potato, the mean LA for *A. grandis* was 464.1 (SD = 53.0) compared to 345.9 (SD = 48.0) for *A. tomatophila*. On tomato, the mean LA for *A. tomatophila* was 64.9 (SD = 5.2) compared to 33.8 (SD = 8.1) for *A. grandis*. Although larger lesions were formed when *A. grandis* and *A. tomatophila* were inoculated on their host of origin, there was no statistical difference between species on a particular host. The isolates were recovered from the lesions to fulfil Koch's Postulates. Additionally, reconstruction of the phylogeny was used to investigate the relationships among the species. The major allergen *Alt a1* and glyceraldehyde-3-phosphate (*Gpd*) genes data set were analysed. The Brazilian isolates from tomato clustered with the ex-type *A.*

tomatophila isolate with strong support from parsimony (MP) and neighbour-joining (NJ) analyses. The *A. grandis* population clustered most closely with the ex-type isolate of *A. grandis* in a clade also including *A. solani* (Fig. 2). *Alternaria tomatophila* has been recorded to cause early blight on tomato in the United States, Australia, New Zealand, and Venezuela (Simmons, 2000). In Brazil, *A. solani* has been reported as the causal agent of early blight (Lourenço Jr. *et al.*, 2009). We report here that at least two additional species are widely distributed on tomato and potato fields in Brazil.

Acknowledgements

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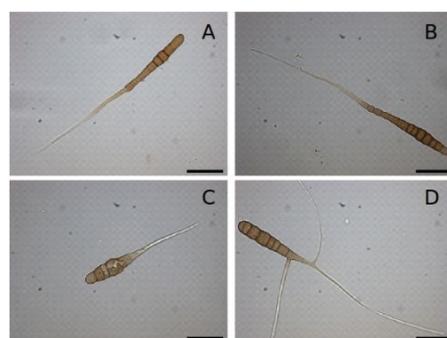


Figure 1

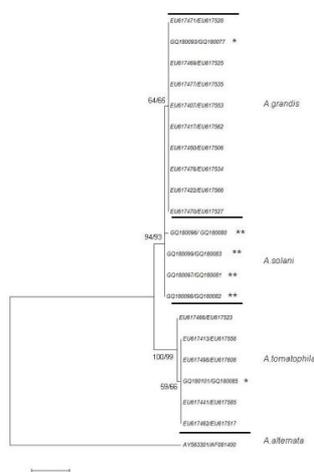


Figure 2

Table 1. Morphological characteristics of the *Alternaria* spp. isolates collected from infected potato and tomato plants compared with the representative isolate of *Alternaria solani*.

Morphological characteristic ¹	Species		
	<i>A. solani</i> ²	<i>A. tomatophila</i> ³	<i>A. grandis</i> ⁴
Conidium body length	85 - 100	70 - 99	102 - 184
Conidium body width	18 - 22	12 - 20	14 - 17
Beak length ⁵	83 - 110	99 - 197	135 - 206
Number of transversal septa	8 - 12	7 - 12	9 - 14
Number of longitudinal septa	1 - 3	1 - 4	0 - 3
Number of beaks ⁵	1	1 and 2	1

¹ Range of minimum and maximum values observed in the isolates analyzed.

² Measurements from the representative isolate EGS 44-098.

³ Measurements from the isolates used in this study.

⁴ Measurements were made of conidia with one beak.

⁵ Number of beaks predominant in conidia population (Simmons, 2007).

Figure 3

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