First Report of Gummosis Caused by *Phytophthora frigida* on Black Wattle in Brazil

T. C. A. Alves, D. J. Tessmann, Universidade Estadual de Maringá, Maringá 87020-090, Paraná, Brazil; K. L. Ivors, Department of Horticulture and Crop Science, Cal Poly, San Luis Obispo, California 93407, USA; J. B. Ristaino, North Carolina State University, Department of Plant Pathology, Raleigh, North Carolina 27695, USA; A. F. Santos, Empresa Brasileira de Pesquisa Agropecuária - Embrapa Forestry, Laboratory of Forest Pathology, Colombo 83411-000, Paraná, Brazil

Black wattle (*Acacia mearnsii*), a tree species native to Australia, is considered the main source of bark for the tannin industry worldwide. It is the third most cultivated forest species in Brazil. Gummosis, caused by *Phytophthora* spp., is a major disease affecting black wattle plantations in Brazil, where the disease incidence can reach up to 43%. The most common disease symptoms are dark brown, irregular, necrotic lesions on the trunk, which may or may not be accompanied by gum exudation. Severe infection can lead to plant death. *Phytophthora nicotianiae* and *P. bohemeriae* were reported as causative agents of black wattle gummosis in Brazil (Santos et al. 2006). In South Africa, besides these species, *P. meadii* was also recorded on black wattle (Roux and Wingfield 1997) and *P. frigida* on green wattle (*A. decurrens*) (Maseko et al. 2007). A survey in six-year-old black wattle plantations located in the Piratini and Cristal counties in the state of Rio Grande do Sul in 2008 revealed the occurrence of a third *Phytophthora* species causing gummosis on black wattle in Brazil, *P. frigida.* Isolates were obtained from bark tissue of 24 diseased trees, and all were identified as *P. frigida* based on morphological characteristics, and the sequence of portions of the internal

transcribed sequences (ITS) of ribosomal DNA, and the cytochrome oxidase subunits I (*cox*I) and II (*cox*II) genes. Morphological characterization of colonies on carrot-agar medium (CA) revealed persistent sporangia with prominent papilla, formed individually or in loose sympodium. The dimensions of sporangia ranged from 29 to 71 µm × 20 to 53 µm (avg. 46 × 33 µm), with length-to-breadth ratios of 1.3 to 1.5 (avg. 1.4). The sporangial shape was predominantly ovoid. The colony growth rate was 12 mm/d at 24 to 30°C. The isolates produced globose chlamydospores, terminal or intercalary, and measured 21 to 55 µm diameter (avg. 32 µm). All isolates tested were heterothallic and produced oospores globose, aplerotic, 18 to 31 µm (avg. 24 µm) in diameter, with amphigenous antheridium. Oogonium diameter was from 22 to 37 µm (avg. 30 µm). Portions of the ITS (815 bp) and the *cox*I (654 bp) and *cox*II (945 bp) were amplified by PCR. BLAST search of the GenBank database revealed that the fragments for ITS (KU570067), and *cox*I (KU570065), and *cox*II (KU570066) sequence fragments from isolate P92 were 99-100% similar with the accessions of *P. frigida* HQ261569 and HQ261316 (Robideau et al. 2011). To confirm pathogenicity, the 24 isolates of *P. frigida* were used to inoculate 10 one-year old black wattle plants. For inoculation, a mycelial plug from a one-week-old isolate grown on CA was placed on a stem wound made with a cork borer (6 mm diam.) and sealed with a strip of parafilm. Plants were kept under greenhouse conditions at temperatures ranging from 22 to 32 °C. Four weeks after inoculation, the stems of the control plants, inoculated with sterile CA plugs, only showed small dark brown spots at the inoculation points. The *P. frigida* inoculated stems exhibited necrotic lesions up to 4 cm in lenght, with presence or absence of gum. *Phythophtora frigida* was re-isolated from each infected stem. Worldwide, this is the first report of *P. frigida* occurring in *A. mearnsii*.

***References*:**

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