

## First Report of Root and Basal Stem Rot Caused by *Phytophthora cryptogea* and *P. inundata* on Dwarf Banana in Italy.

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In Sicily (southern Italy) local cultivars of dwarf banana (*Musa acuminata*) are cultivated for edible fruit and as ornamental plants. During the summer of 2015, in an ornamental nursery of Aci San Filippo (Catania province), eastern Sicily, ten out of forty mature plants of dwarf banana grown in the field showed leaf chlorosis, wilt and sudden collapse of the entire plant associated with root and basal stem rot. Two *Phytophthora* species (overall 24 and 22 isolates, respectively) were consistently recovered directly from rotted roots and stems on BNPRA-HMI selective medium (Masago et al. 1977). Pure cultures of both species were obtained by single-hypha isolations. The first species formed slight petaloid colonies on potato dextrose agar (PDA) and slightly fluffy colonies on V-8 juice agar (V8A). It grew between 2 and 30°C, with an optimum of 25°C. On V8A discs flooded with non-sterile soil extract this species produced persistent, ovoid to obpyriform, non-papillate, internally proliferating sporangia (35 to 57 x 22 to 33µm, mean length/breadth 1.5). In pairings with A1 and A2 reference isolates of *P. cryptogea* and *P. drechsleri*, all 24 isolates formed oogonia (diameter 20 to 36 µm), amphigynous antheridia (diameter 7 to 16 µm) and plerotic oospores (diameter 14 to 36 µm) only with the A2 reference isolates. The 22 isolates of the second species formed rosaceous colonies on PDA and stellate colonies on V8A. They grew between 5 and 35 °C, with an optimum of 28 °C and produced persistent, ovoid to obpyriform, non-papillate, internally proliferating sporangia (32 to 57 x 48 to 70, mean l/b 1.3). These isolates failed to produce gametangia and oospores in single cultures and in pairings with A1 and A2 reference isolates. PCR amplification and sequence analysis of ITS regions of rDNA of the isolates of each species, using ITS 4 and ITS 6 primers (Cooke et al. 2000), revealed 100% similarity between our dwarf banana isolates (GenBank Accession Nos KX853521 and KX853523) and several GenBank Accessions of *P. cryptogea* and *P. inundata*, respectively. Mitochondrial partial COI fragments for cytochrome oxidase subunit 1 (KX853520 and KX853522) amplified according to Robideau et al. (2011), also showed 100% similarity with GenBank Accessions of *P. cryptogea* and *P. inundata*,

respectively. The first species was identified as *P. cryptogea* (CBS 141725 and CBS 141726) and the second one as *P. inundata* (CBS 141727 and CBS 141732). Pathogenicity of the deposited isolates of both species was tested separately by transplanting 1 year-old seedlings of dwarf banana (5 plants per isolate) in pots filled with infested soil (Salamone et al. 2011). Five control plants were transplanted in pots containing non-infested soil. All plants were maintained in saturated soil for 48 h after transplanting and then grown at 24 to 28°C in greenhouse in natural light/dark cycle, and watered once a week. The inoculated plants developed symptoms of root and crown rot within 4 weeks. Control plants remained healthy. *Phytophthora cryptogea* and *P. inundata* were reisolated solely from symptomatic plants. Reports of infections by *Phytophthora* spp. on monocots are not frequent (Erwin and Ribeiro, 1996); most probably soil waterlogging may have been a predisposing factor. To our knowledge this is the first report of these two *Phytophthora* species on dwarf banana worldwide.

#### References :

- Cooke D.E.L., et al. 2000.** Fungal Genetics and Biology 30: 17.
- Erwin, D.C. and Ribeiro, O.K. 1996.** Phytophthora Diseases Worldwide. APS Press, St. Paul, MN.
- Masago, H., et al. 1977.** Phytopathology, 67:425.
- Robideau, G.P., et al. 2011.** Mol. Ecol. Resour. 11: 1002.
- Salamone, A., et al. 2011.** Plant Dis. 95:358.