
Phytophthora personensis

Fungal Planet 1104 – 29 June 2020

Phytophthora personensis Z.G. Abad, W. Gut. & T.I. Burgess, *sp. nov.*

Etymology. Named after Person County, North Carolina, the location where the first specimen of the species was isolated.

Classification — *Peronosporaceae*, *Peronosporidae*, *Oomycota.*

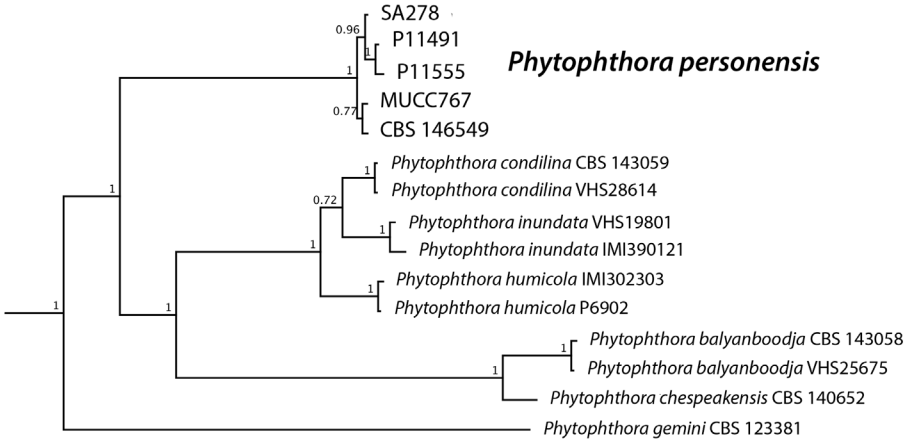
Sporangia produced abundantly in non-sterile soil extract; persistent and produced usually on unbranched sporangiophores, non-papillate, most commonly ovoid (73 %), often ellipsoid (18 %) and rarely limoniform or obpyriform; 62.8 ± 12.7 × 44.2 ± 9.9 µm (overall range 28.5–85.6 × 15.1–60.5 µm), length/breadth ratio 1.4 ± 0.2. *Sporangial proliferation* in chains of internally proliferating sporangia, both nested and extended. *Hyphal swellings* common, catenulate to globose 21–(31.6 ± 5.6)–49.4 µm. *Chlamydospores* common, globose 29.9–(54.8 ± 11.5)–78.1 µm. *Gametangia* not produced in single culture or when paired with A1 and A2 tester strains of *P. cinnamomi*, *P. tropicalis*, *P. cryptogea* and *P. cambivora*. Radial growth rates on V8 agar at optimum temperature (25–30 °C) and near the maximum temperature (37.5 °C), 12.6 ± 0.33 mm/d and 1.7 ± 0.23 mm/d, respectively.

Culture characteristics — Submerged colonies with no pattern were produced on malt extract, carrot and V8 agar. Cottony colonies with regular margins were produced on potato dextrose agar.

Typus. Australia, Western Australia, Busselton, baited from soil associated with dying *Grevillea mccutcheonii* (*Myrtaceae*), 2005, collected by Department of Parks and Wildlife (holotype MURU481, culture ex-type CBS 146549 = VHS14081; ITS, ß-tubulin, HSP90, *cox*I, *NADH* and LSU sequences GenBank EU301169, MF326805, MF326890, MF326887, MF326928 and MT159417, MycoBank MB834875).

Additional materials examined. Australia, Western Australia, Pemberton, baited from soil associated with dying *Rubus fruticosus* (*Rosaceae*) aggregate, 2012, *S. Aghighi*, culture SA278; Victoria, Ti-Tree Creek, baited from water, 2008, *W. Dunstan*, culture MUCC 767. – USA, Northern Carolina, Person County, from necrotic roots of *Nicotiana tabacum* (*Solanaceae*), 2002, *W. Gutierrez*, cultures by G. Abad at former NCSU-PPIL P11555 = CBS 121980 and P11491.

Notes — Phylogenetically, *P. personensis* resides in a strongly supported terminal clade and shares a common ancestor with *P. inundata* (Brasier et al. 2003), *P. condilina* (Burgess et al. 2018), *P. humicola* (Ko & Ann 1985), *P. balyanboodja* (Burgess et al. 2018) and *P. chesapeakensis* (Man in 't Veld et al. 2019). Together with *P. gemini* (Man in 't Veld et al. 2011) these species form a species cluster within clade 6 of the *Phytophthora* phylogeny (Burgess et al. 2018). In a multigene phylogeny of the ITS, *HSP90*, *BT*, *NADH* and *cox*I gene regions, *P. personensis* differs from both *P. condilina* and *P. humicola* by 4.4 %, *P. inundata* by 5.2 %, *P. balyanboodja* and *P. chesapeakensis* by 9.1 % and *P. gemini* by 8.3 %. All these species are morphologically similar; they all produce ovoid persistent, non-papillate sporangia that are borne terminally and they all have high temperature optima and maxima for growth. *Phytophthora personensis* appears to be sterile in culture and thus differs from *P. inundata*, *P. humicola* and *P. condilina* as these three species readily produce homothallic oogonia. *Phytophthora personensis* produces chlamydospores and thus differs from the three other sterile species in the clade, *P. balyanboodja*, *P. chesapeakensis* and *P. gemini. Phytophthora personensis* has been recovered from a variety of hosts on two continents, North America and Australia, and at this point in time its origin cannot be determined.



Bayesian inference tree based on a concatenated ITS, ß-tubulin, *HSP90*, *cox*I and *NADH* sequence alignment showing the placement of *P. personensis* in *Phytophthora* clade 6a generated in MrBayes v. 3.2.6 (Ronquist & Huelsenbeck 2003) as a plugin in Geneious Prime® 2019.2.3 (Biomatters Ltd.) using the GTR substitution model. The posterior probability values are shown at the nodes. The tree was rooted to *P. rosacearum* (not shown) and the novel species is shown in **bold** font.

Colour illustrations. *Grevillia* sp., host of the type isolate. Typical ovoid and ellipsoid sporangia; proliferation is internal and extended and chlamydospores were common; cottony colony on potato dextrose agar. Scale bar = 20 µm.

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