
Phytophthora amnicola

Fungal Planet 107 – 31 May 2012

Phytophthora amnicola T.I. Burgess & T. Jung, *sp. nov.*

Etymology. Named for the riverside habitat of this species.

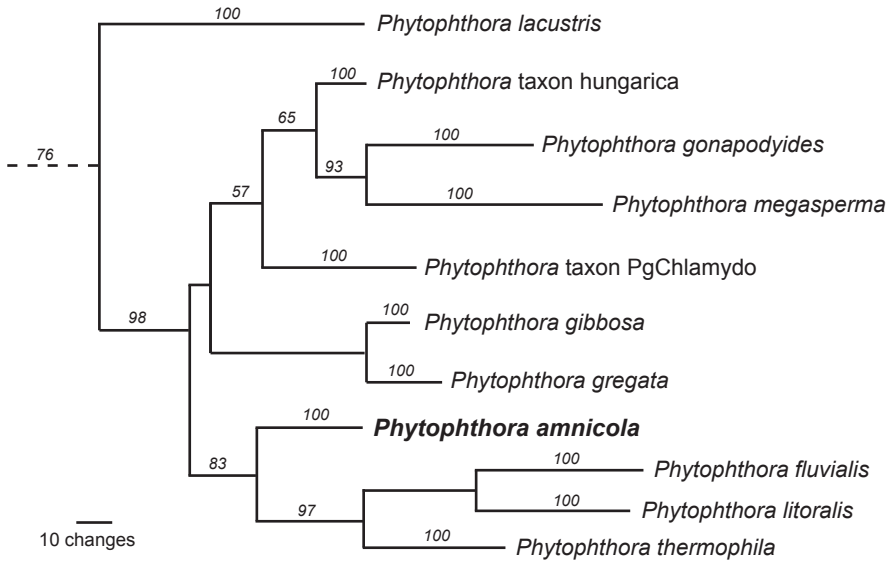
Sporangia produced abundantly in non-sterile soil extract, non-caducous, non-papillate, frequently ovoid to limoniform or rarely ellipsoid, obpyriform or pyriform, often with a long tapering base; 62 ± 9.0 × 35.3 ± 5.6 µm (overall range 39–78 × 17–43 µm), length/breadth ratio 1.8 ± 0.2. *Sporangial proliferation* in chains of internally proliferating sporangia in both a nested and extended way. Internally proliferating sporangiophores, sometimes branching inside or just outside the empty sporangium. Ellipsoid to irregular, catenulate hyphal swellings in clusters (14.2 ± 4.0 µm). Club-shaped, knotty lateral hyphae formed in water. *Chlamydospores* not observed. *Gametangia* not produced in single culture or when paired with A1 and A2 tester strains of *P. cinnamomi*. Radial growth rates on V8 agar at optimum temperature (25–32.5 °C) and near the maximum temperature (37.5 °C) 6.4 ± 0.4 mm/d and 0.3 ± 0.07 mm/d, respectively.

Culture characteristics — Colonies are rosaceous on carrot agar and stellate with limited aerial mycelium on V8 agar; growth on potato-dextrose agar is very slow.

Typus. Western Australia, Perth, Poison Gully Creek, baited from still water, Dec. 2009, *D. Hüberli*, holotype MURU 471; cultures ex-type CBS 131652 = DH228, ITS, ß-tubulin, HSP90, *cox*1, NADH, and LSU sequence GenBank JQ029956, JQ029952, JQ029944, JQ029948, JQ029940, and JX069838 respectively, MycoBank MB563849.

Additional specimens examined. Western Australia, Pemberton, baited from soil beneath dying *Patersonia* spp., Dec. 2009, Department of Environment and Conservation, VHS19503; Perth, Lake Jualbup, baited from still water, DH013; Perth, Canning River, baited from still water, DH237.

Notes — Phylogenetically, *P. amnicola* resides in a strongly supported terminal clade and shares a common ancestor with *P. fluvialis, P. litoralis*, and *P. thermophila* (Crous et al. 2011, Jung et al. 2011). In a multigene phylogeny of the ITS, HSP90, BT, NADH, and *cox*1 gene regions, *P. amnicola* differs from *P. fluvialis* by 144 steps (3.1 %), *P. litoralis* by 158 steps (3.4 %), and *P. thermophila* by 121 steps (2.6 %). These four species have all been isolated from waterways in the south-west of Western Australia. *Phytophthora amnicola* has a life strategy similar to *P. litoralis* and *P. fluvialis,* being sterile and having abundant and continuous asexual multiplication in watercourses via chains of nested and extended proliferating sporangia, external proliferation, and the production of secondary lateral sporangia. The species can be separated by its overall larger sporangia and its broad optimum for growth (25–32.5 °C) as opposed to a peak at 32.5 °C for the other species. As with *P. thermophila* and *P. litoralis, P. amnicola* grows very slowly on PDA, but unlike these species it produces rosaceous colonies on carrot agar.



The most parsimonious tree (TL = 965; CI = 0 64; RI = 0.78) obtained from a heuristic search with 100 random taxon additions of a combined ITS, BT, HSP90, *cox*1, and NADH sequence alignment using PAUP v. 4.0b10. The scale bar shows 10 changes, and bootstrap support values from 1 000 replicates are shown at the nodes. Two isolates of each known species and four isolates of *P. amnicola* were included in the analysis. The species described here is printed in **bold** face. The tree was rooted to *P. inundata, P. humicola,* and *P. asparagi* (not shown). The alignment and tree are available in TreeBASE (www.treebase.org).

Colour illustrations. Typical niche for recovery of *P. amnicola* (T.I. Burgess); mature sporangia: limoniform; limoniform with widening of sporangiophore toward the base; ovoid sporangia; internal nested proliferation; internal nested and extended proliferation; catenulate hyphal swellings; club-shaped knotty lateral hyphae (T. Jung). Scale bar = 25 µm. Stellate colony on V8 agar (T.I. Burgess).

Treena I. Burgess, Daniel Hüberli & Giles E.St.J. Hardy, Centre for Phytophthora Science and Management, Murdoch University, 90 South Street, Murdoch, WA 6150, Australia;
e-mail: tburgess@murdoch.edu.au, daniel.huberli@agric.wa.gov.au & g-hardy@murdoch.edu.au
Michael J.C. Stukely, Science Division, Department of Environment and Conservation, Locked Bag 104, Bentley Delivery Centre, WA 6983, Australia;
e-mail: mike.stukely@dec.wa.gov.au
Thomas Jung, Phytophthora Research and Consultancy, Thomastr. 75, D-83098 Brannenburg, Germany; e-mail: dr.t.jung@t-online-de