Gnomoniopsis smithogilvyl
Gnomoniopsis smithogilvyi


Etymology. Named after New Zealand Plant Pathologist, Dr Harvey Smith, and the Australian chestnut grower, David Ogilvy, for their contribution to our understanding of the pathogen, and its epidemiology (Ogilvy 1998, Smith & Ogilvy 2008).

Diseased kernels with pale, medium and dark brown lesions occurring on endosperm and embryo of the chestnut. Lesions occur as spotting, or with a clear margin at the stylar end, hilum end, sides of the kernel, or a combination of these. Perithecia in Australia occur on overwintered dead burrs and branches of Castanea sativa and C. crenata × C. sativa hybrids. They are observed on chestnut varieties Decoppi Marone, Purton’s Pride and Red Spanish. Perithecia abundant, without stroma, semi or fully immersed in host tissue, solitary or in groups up to 25, black, globose to subglobose, mostly convex when dry, sometimes concave at sides or apex, (101.5–)238.7–(409.5) µm high (SD = 55, n = 60), (96.5–)242–(410.5) µm diam (SD = 60, n = 68); solitary neck, central, straight or curved, sometimes flexuous, shorter or longer than perithecial diameter, apex sometimes translucent, necks sometimes absent, (113–)223–(399) mm long (SD = 70.5, n = 69), (18.5–)38.5–(55) µm diam at base (SD = 6.5, n = 62), (19.5–)30.5–(56.5) µm diam at apex (SD = 5.2, n = 101). Asci hyaline, unitunicate, inoperculate, obovoid to cylindrical, (20.5–)31–(37.5) mm long (SD = 3.5, n = 79), (4–)5–(6.5) µm diam (SD = 0.5, n = 79), with visible apical ring 1–2 µm wide, containing eight, biseriate ascospores. Ascospores hyaline, 1-septate, pyriform, straight or slightly curved, ends rounded, broader at distal end, (4–)7–(12) µm long (SD = 1.5, n = 101), (1–)2–(3) µm diam (SD = 0.5, n = 101), length-width ratio (l : w) = 1.5, medianly 1-septate, constricted at septum; distal cell with 2–multiple guttules, and basal cell with 1–multiple guttules, appendages absent. Germinating ascospores produced the anamorph in culture.

Anamorph culture characters fast growing, attaining 85 mm after 8–13 d at 25 °C (mean 11 d, n = 3). Mycelia flat and transparent on malt extract agar (MEA) and potato-dextrose agar (PDA), developing in concentric circles particularly on MEA and PDA, woolly to felty and dense after 8–13 d at 25 °C (mean 11 d, n = 30). H : w = 1, with pale orange (6A3) conidia. Conidia hyaline, oval, obvoid, fusoid, pyriform, straight or curved, allantoid, multi-guttulate, without appendages, on MEA (6–)8–(9.5) µm long (SD = 0.5, n = 76), (2–)2.5–(4) µm wide (SD = 0.4, n = 76), l : w = 3, on MYA (5.5–)6.5–(7.5) µm long (SD = 0.5, n = 76), (2–)3.5–(3.5) µm wide (SD = 0.5, n = 76), l : w = 2.5, on PDA (6.5–)7.5–(9.5) µm long (SD = 0.5, n = 76), (2–)3–(4) µm wide (SD = 0.5, n = 76), l : w = 2.5.


Notes — Gnomoniopsis smithogilvyi overwinters in its teleomorph form as a saprobe on dead burrs and branches of Castanea sp. (Fagaceae), and is isolated from rotten chestnut kernels, or as an endophyte from asymptomatic flowers, leaves and stems (Shuttleworth 2012). Species of Gnomoniopsis on Castanea are documented as endophytes and associated with rotten chestnuts and chestnut galls in Italy (Gentile et al. 2009, Tamietti et al. 2009, Magro et al. 2010, Vettraino et al. 2011), are documented in New Zealand (Sogonov et al. 2008), and have been isolated from chestnut blight cankers in India (Dar & Rai 2011). Multi-gene phylogenetic analyses using β-tubulin, ITS, rpb2 and tef1-α genes showed G. smithogilvyi is most closely related to G. clavulata (CBS 121255) and G. paraclavulata (CBS 123202) (Shuttleworth 2012). Key morphological differences between G. smithogilvyi and the other two species include the aggregation of perithecia in host tissue (G. smithogilvyi are single or in groups up to 25, G. clavulata and G. paraclavulata are recorded as single (Sogonov et al. 2008)), perithecia of G. smithogilvyi are larger (mean) height and width than the other two species and perithecia of G. smithogilvyi have longer necks, ascospores of G. smithogilvyi are smaller than the other two species and the position of the septum in the ascospores is different (G. clavulata has a median septum, G. clavulata has a submedian septum (36 % of ascospore length), G. paraclavulata has a submedean septum (40 % of ascospore length); Walker et al. 2010). The three species share the same host range, occurring on members of Fagaceae. To date G. clavulata has been recorded on Fagus sylvatica, Quercus spp. (Q. liliofolia, Q. falcata, Q. marilandica, Q. nigra, Q. prinus, Q. rubra) (Sogonov et al. 2008, Walker et al. 2010), G. paraclavulata has been recorded on Q. alba (Sogonov et al. 2008), and G. smithogilvyi has been recorded on Castanea sp., C. sativa, and Q. ilix (Sogonov et al. 2008, Shuttleworth 2012). Phylogenetic analysis of the ITS region grouped Australian ascospore isolates, chestnut rot isolates, and endophyte isolates in the same node as isolates from India, Italy, and New Zealand with 100 % maximum parsimony bootstrap and 1.00 Bayesian posterior probability. This indicates that species of Gnomoniopsis are present in these countries, and that G. smithogilvyi is likely one of them.

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