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# Molecular phylogenetic analyses reveal a close evolutionary relationship between *Podosphaera* (Erysiphales: Erysiphaceae) and its rosaceous hosts

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**Abstract**



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*Podosphaera* is a genus of the powdery mildew fungi belonging to the tribe *Cystothecaceae* of the *Erysiphaceae*. Among the host plants of *Podosphaera*, 86 % of hosts of the section *Podosphaera* and 57 % hosts of the subsection *Sphaerotheca* belong to the *Rosaceae*. In order to reconstruct the phylogeny of *Podosphaera* and to determine evolutionary relationships between *Podosphaera* and its host plants, we used 152 ITS sequences and 69 28S rDNA sequences of *Podosphaera* for phylogenetic analyses. As a result, *Podosphaera* was divided into two large clades: clade 1, consisting of the section *Podosphaera* on *Prunus* (*P. tridactyla* s.l.) and subsection *Magnicellulatae*; and clade 2, composed of the remaining member of section *Podosphaera* and subsection *Sphaerotheca*. Because section *Podosphaera* takes a basal position in both clades, section *Podosphaera* may be ancestral in the genus *Podosphaera*, and the subsections *Sphaerotheca* and *Magnicellulatae* may have evolved from section *Podosphaera* independently. *Podosphaera* isolates from the respective subfamilies of *Rosaceae* each formed different groups in the trees, suggesting a close evolutionary relationship between *Podosphaera* spp. and their rosaceous hosts. However, tree topology comparison and molecular clock calibration did not support the possibility of co-speciation between *Podosphaera* and *Rosaceae*. Molecular phylogeny did not support species delimitation of *P. aphanis*, *P. clandestina*, *P. ferruginea*, *P. spiraeae* and *P. tridactyla* in their current circumscriptions, which suggests the need for revision of these species.

**Keywords:** 28S RDNA; EVOLUTION; ITS; MOLECULAR CLOCK; PHYLOGENY; POWDERY MILDEW FUNGI; ROSACEAE

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