

## ***Paecilomyces farinosus* destroys powdery mildew colonies in detached leaf cultures but not on whole plants**

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### **Abstract**

Since 2001, several isolates of *Blumeria graminis*, the causal agent of cereal powdery mildew, maintained on detached leaves at the John Innes Centre, Norwich, UK, have spontaneously become infected with an unknown filamentous fungus whose mycelia have quickly overgrown the powdery mildew colonies and destroyed them completely. A total of five isolates of the contaminant were obtained and identified as *Paecilomyces farinosus* based on morphological characteristics and rDNA ITS sequence data. To determine whether these *P. farinosus* isolates can be considered as biocontrol agents (BCAs) of powdery mildews, we studied the interactions between *P. farinosus* and the following four powdery mildew species: *B. graminis* f.sp. *hordei* infecting barley, *Oidium neolycopersici* infecting tomato, *Golovinomyces orontii* infecting tobacco and *Podospheera fusca* infecting cucumber. The powdery mildew colonies of all these four powdery mildew species were quickly destroyed by *P. farinosus* in leaf cultures but neither conidial suspensions nor cell-free culture filtrates of *P. farinosus* isolates could suppress the spread of powdery mildew infections on diseased barley, tomato, tobacco or cucumber plants in the greenhouse. It is concluded that *P. farinosus* cannot be considered as a promising BCA of powdery mildew infections although it can destroy powdery mildew colonies in detached leaf cultures and can be a menace during the maintenance of such cultures of cereal, apple, cucurbit and tomato powdery mildew isolates.

Powdery mildew fungi are obligate biotrophic parasites of many plants and as such can survive in living host plant tissues only. For various research purposes, many laboratories maintain isolates of different powdery mildew fungi on detached leaves or leaf segments of cereals (Brown and Wolfe, 1990; Wyand and Brown, 2003), cucurbits (Bardin et al., 1997; Nicot et al., 2002; Shishkoff and McGrath, 2002; Romero et al., 2003), tomato (Kiss et al., 2001), tobacco (Szentiványi and Kiss, 2003), apple (Scheewe and Ketznel, 1994; Urbanietz and Dunemann, 2005), and other crops. In general,

the leaves of the host plant are surface-sterilized, placed in small plates or tubes on artificial media, for example on benzimidazole agar or on mannitol sucrose agar (MSA), then the leaves are infected with conidia of a given powdery mildew isolate under near sterile conditions and kept for 2–6 weeks at 15–20 °C under artificial illumination. This method makes possible the maintenance of a large number of powdery mildew isolates each originating from a single colony or even a single conidium (Nicot et al., 2002). However, maintenance is laborious and the detached leaf cultures