

Dry Mycelium of *Penicillium chrysogenum* Induces Resistance Against *Verticillium* Wilt and Enhances Growth of Cotton Plants

Hezhong Dong^{1,2} and Yigal Cohen^{1,*}

Dry mycelium (DM) of *Penicillium chrysogenum* and its water extract (DME) were examined for their effects on induced resistance against *Verticillium* wilt and plant growth of cotton in the greenhouse. Soil application of 0.1–5% DM or 0.5–5% DME provided significant protection against the wilt, relative to the control. As neither DM nor DME inhibited mycelial growth of *Verticillium dahliae* *in vitro*, it is suggested that the disease-controlling effects of DM or DME are attributed to induced resistance. DME (5%), as well as DME treated with chloroform or cold acetone, were as effective as 2% DM in reducing disease severity of *Verticillium* wilt, implying that the resistance-inducing substance(s) in DM are mostly water-soluble, with neither proteins nor lipids likely to be responsible for the induction of resistance. No significant difference in root colonization with *V. dahliae* was found between control-inoculated and 2% DM- or 5% DME-inoculated plants. However, colonization of hypocotyls and epicotyls was drastically suppressed by either 2% DM or 5% DME relative to the control. Treatments with 2% DM or 5% DME significantly increased ionically-bound peroxidase (POX) activity in roots, hypocotyls and the second leaf of cotton plants, with the hypocotyls expressing the highest increase. Soil application of DM or DME increased plant height, fresh and dry weight of inoculated and non-inoculated cotton plants, relative to their corresponding controls. It is concluded that DM may be used in cotton crops to promote plant growth and to induce resistance against *V. dahliae*. POX might be associated with the defense against *Verticillium* wilt.

KEY WORDS: *Verticillium dahliae*; peroxidase activity; *Gossypium hirsutum*; *Gossypium barbadense*.

Received Aug. 1, 2001; received in final form Nov. 24, 2001; <http://www.phytoparasitica.org> posting Jan. 9, 2002.

¹Faculty of Life Sciences, Bar-Ilan University, Ramat Gan 52900, Israel. *Author for correspondence [Fax: +972-3-5354133; e-mail: coheny@mail.biu.ac.il].

²On sabbatical leave from Cotton Research Center, Shandong Academy of Agricultural Sciences, Jinan 250100, China.