

C. Schneider, C. Leifert, F. Feldmann (eds.)

Endophytes for plant protection: the state of the art

**Proceedings of the 5th International Symposium
on Plant Protection and Plant Health in Europe**

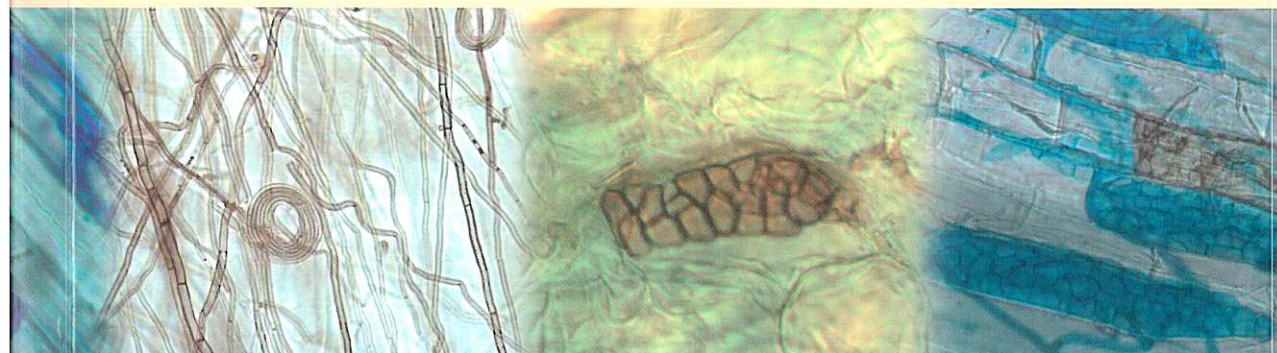
held at the Faculty of Agriculture and Horticulture (LGF),
Humboldt University Berlin, Germany, 26-29 May 2013



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Bibliografische Information der Deutschen Bibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie;

Detaillierte bibliografische Daten sind im Internet über <http://dnb.ddb.de> abrufbar.

ISBN: 978-3-941261-11-2

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Lectorate: Dr. Carolin Schneider, Dr. Carlo Leifert, Dr. Falko Feldmann

Production: Dr. C. Carstensen, InterKulturIntern, Edenkoben

Design (cover): C. Senftleben, Braunschweig

Foto (cover): Dr. G. M. Kovács, D. G. Knapp (Eötvös Loránd Univ., Budapest, Hungary),
Dr. G. Bills (Fundación MEDINA, Granada, Spain)

Printed in Germany by Lebenshilfe Braunschweig gemeinnützige GmbH

5-24 Potentialities of endophytic fungi of olive tree as biological control agents against *Colletotrichum acutatum* and *Verticillium dahliae*

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ABSTRACT

Fungal endophytes grow asymptotically within the tissues of all vascular plants and some are known to provide their host plants with tolerance to different types of environmental stress, including fungal pathogens. Anthracnose and Verticillium wilt are the most important olive diseases in worldwide caused by the fungus *Colletotrichum acutatum* and *Verticillium dahliae*. The present study aimed to determine the antagonistic ability of endophytic fungi against both casual agents, to be further used as biological control agents. The endophytic fungi studied were isolated from leaves, branches and roots of olive tree Cv. Cobrançosa which is moderately tolerant to both diseases. Dual cultures of five endophytes (namely *Hypocrea lixii*, *Paecilomyces lilacinus*, *Fusarium oxysporum*, *Penicillium commune*, *Penicillium roseopurpureum*) with phytopathogens were carried out on potato dextrose agar medium, and the internal radial fungal growth, hyphae morphology, sporulation and spore viability were evaluated during 15 days. Dual cultures of the same species were used as controls. Among the endophytes tested, *H. lixii*, *P. lilacinus*, have showed the highest inhibitory effect on mycelia growth of *C. acutatum* (50% and 38%) and *V. dahliae* (55% and 32%), respectively. *Penicillium commune*, have reduced significantly the *C. acutatum* sporulation between 27-78%, and germination between 37-82%, when compared to control. The number and the viability of the spores produced by *C. acutatum* challenged by endophytes were significantly reduced compared to control, with values above 80% and 68%, respectively. In *V. dahliae* the production and the viability of spores were only slightly reduced when compared to controls. Observations made by microscope in the interacting zone showed several morphological alterations including growth of thin hyphae compared to control cultures, vacuolation and lysis of hyphal of the pathogens. The results obtained support the potential of fungal endophytes as biological control agents against both *C. acutatum* and *V. dahliae*.

ACKNOWLEDGMENTS

This work has been supported by FCT (reference grant PTDC/AGR-PRO/4354/2012).