

***Eurotium halophilicum*: the fungus of the library's ecological niches**

A. Micheluz^{1*}, S. Manente², V. Tigini³, V. Prigione³, M. Rovea⁴, G. Formenton⁴, M. Sulyok⁵, R. Krska⁵, F. Pinzari⁶, G.C. Varese³, G. Ravagnan²

¹*Dept. of Environmental Sciences, Informatics and Statistics, Ca' Foscari University, Venice, Italy*

²*Dept. of Molecular Sciences and Nanosystems, Ca' Foscari University, Venice, Italy*

³*Dept. of Life Sciences and Systems Biology, University of Turin, Turin, Italy*

⁴*Dipartimento Regionale Laboratori, Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto, Venice, Italy*

⁵*Dept. IFA-Tulln, University of Natural Resources and Life Science Vienna (BOKU), Vienna, Austria*

⁶*Research Centre for the Soil-Plant System, Rome, Italy*

Introduction. In the recent years, the attention towards the xerophilic fungal species *Eurotium halophilicum* raised considerably, because of its concurrence with several cases of contaminated archive and library collections around Italy. Thousand of books were discovered as affected with the same fungal species, which appears as spread white spotted mycelia grown on the book covers. The phenomenon injured the correct book preservation, also with important economic and health implications. However, a lack of knowledge about the physiology, ecology, and secondary metabolite production ability of this particular fungus characterized the available literature.

Aim. The aim of our work was to characterize the fungal species *E. halophilicum*, isolated from a contaminated repository in a Ca' Foscari University library in Venice (Italy). Several chemical and microbiological analyses were carried out in order to improve the general knowledge towards this fungus and give an efficient support to the conservators for its prevention.

Materials and methods. The fungal isolation was performed by sterile cotton swabs wiped on visually contaminated book covers and inoculated onto Petri dishes filled with Malt Extract Agar (MEA) added with 15% of sodium chloride. Scanning electron microscope (SEM) was used for the fungal micro-morphology observations of adhesive strip samples. GS-MS and LC/MS-MS analyses were performed for the detection of *E. halophilicum*'s volatile compounds and secondary metabolites, respectively.

Results. The sampling technique resulted valid for the isolation of the xerophilic fungus. Microscopically observation permitted to highlighted the macro and micro-morphology features, typically of both the teleomorphic and anamorphic state of the fungus, as well as its haired hyphae and the presence of crystals with different shapes directly emerging from the fungal structures. GC-MS analysis was characterized by the emission of about 20 volatiles, with acetone and 2-butanone as the main products. A total of eight secondary metabolites were detected by LC/MS-MS, e.g. deoxybrevianamid E, neoehinulin A and tryprostatin B.

Conclusions. The multi-characterization of *E. halophilicum* provided important information about its peculiar physiology. A special adaptability was recognized, allowing the fungus to growth in very particular ecological niches. Its secondary metabolite production ability can be used for its early detection and to use against its new proliferation in indoor environment.

Keywords. *Eurotium halophilicum*, book contamination, indoor environment, prevention

* E-mail: anna.micheluz@unive.it