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Casing soil as a possible source of green mold contamination in champignon cultivation

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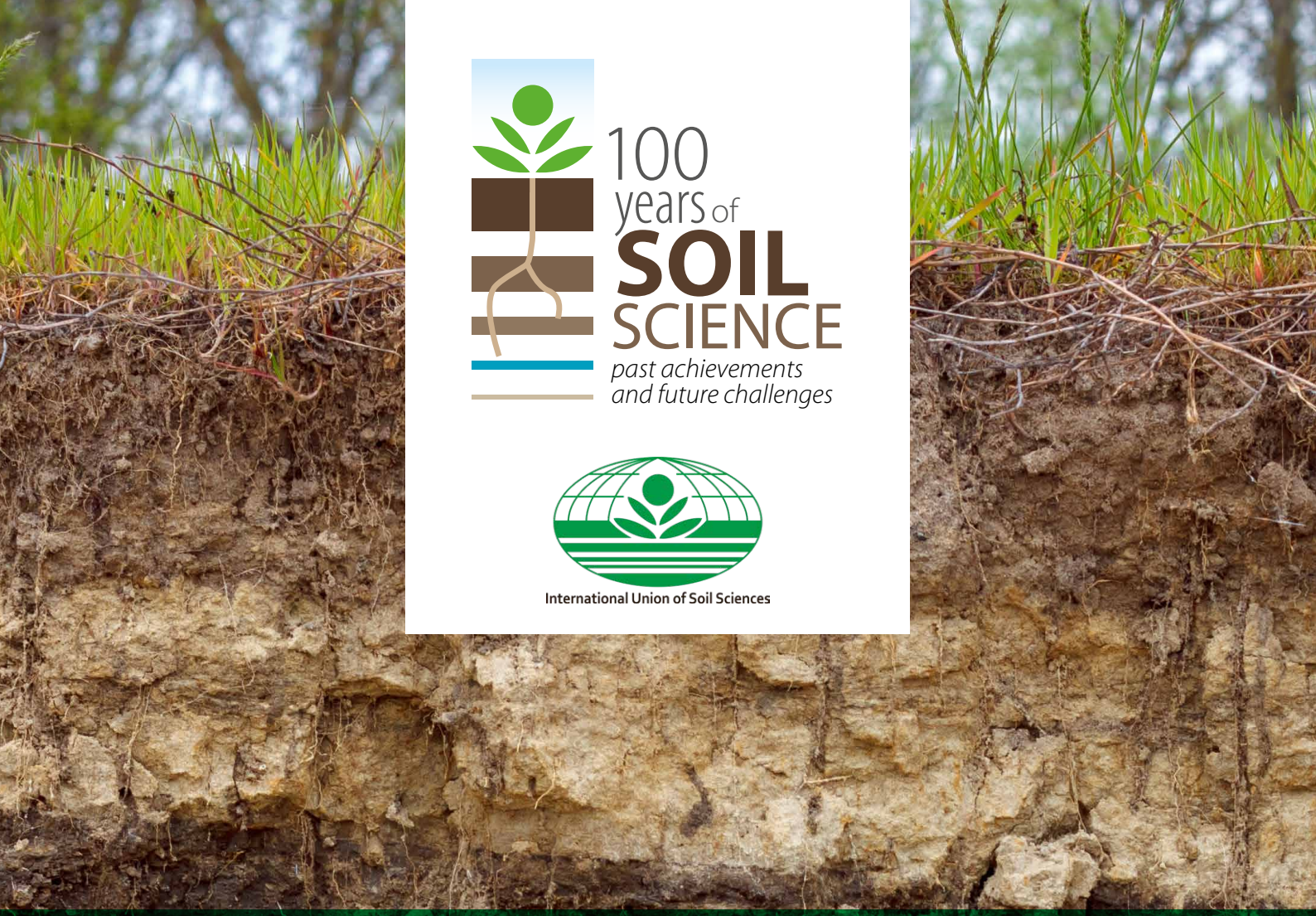

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ABSTRACT BOOK

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WASWAC

SISEF

S.It.E. - Società Italiana di Ecologia

EJP SOIL European Joint Programme

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7. Soil sciences impact on basic knowledge
7.02 129627 - Plant-soil-microbe interactions in the rhizosphere and their potential to address global agricultural challenges

CASING SOIL AS A POSSIBLE SOURCE OF GREEN MOLD CONTAMINATION IN CHAMPIGNON CULTIVATION

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Green mold disease, caused by Trichoderma spp., is the most harmful disease for edible mushroom production, such as champignons. The disease affects yield, fruit body formation, and can be spread through contaminated tools, substrate, clothing, air and insect vectors. Considering the significant degree of yield loss in mushroom production due to the appearance of the mentioned disease, the need for early, rapid and specific detection of the presence of Trichoderma spp. in casing soil is exceptional. In this study, we aimed to examine casing soil as a possible source of Trichoderma contamination, as well as to develop a novel point-of-need assay for its early screening. The casing soil samples were collected in two-time points: before applying on cultivation bags (three samples) and seven days after applications (ten samples). The samples were used for microbiological analysis using cultivation methods, as well as molecular biology analysis using the DNA metabarcoding approach and loop-mediated isothermal amplification method (LAMP). Trichoderma is cultivated from eight casing soil samples. Genomic DNA extracted from a pure Trichoderma culture was used for development of LAMP assay that is evaluated using eDNA from casing soil samples. In addition to valuable information of the diversity of casing soil fungal community, results of DNA metabarcoding confirmed the presence of Trichoderma spp. in one sample taken before, and four samples taken after application of casing soil on cultivation bags. Our results confirm that casing soil is a source of Trichoderma spp. infestation in champignon production, although there are likely multiple sources. The DNA metabarcoding approach was useful for fungal diversity studies, but limited in detecting Trichoderma spp. On the other hand, the developed point-of-need LAMP assay showed high sensitivity in early screening for Trichoderma, although its efficiency is highly dependent on the representativeness of the sample being analyzed.

Keywords: casing soil,champignon production,DNA metabarcoding,LAMP,Trichoderma