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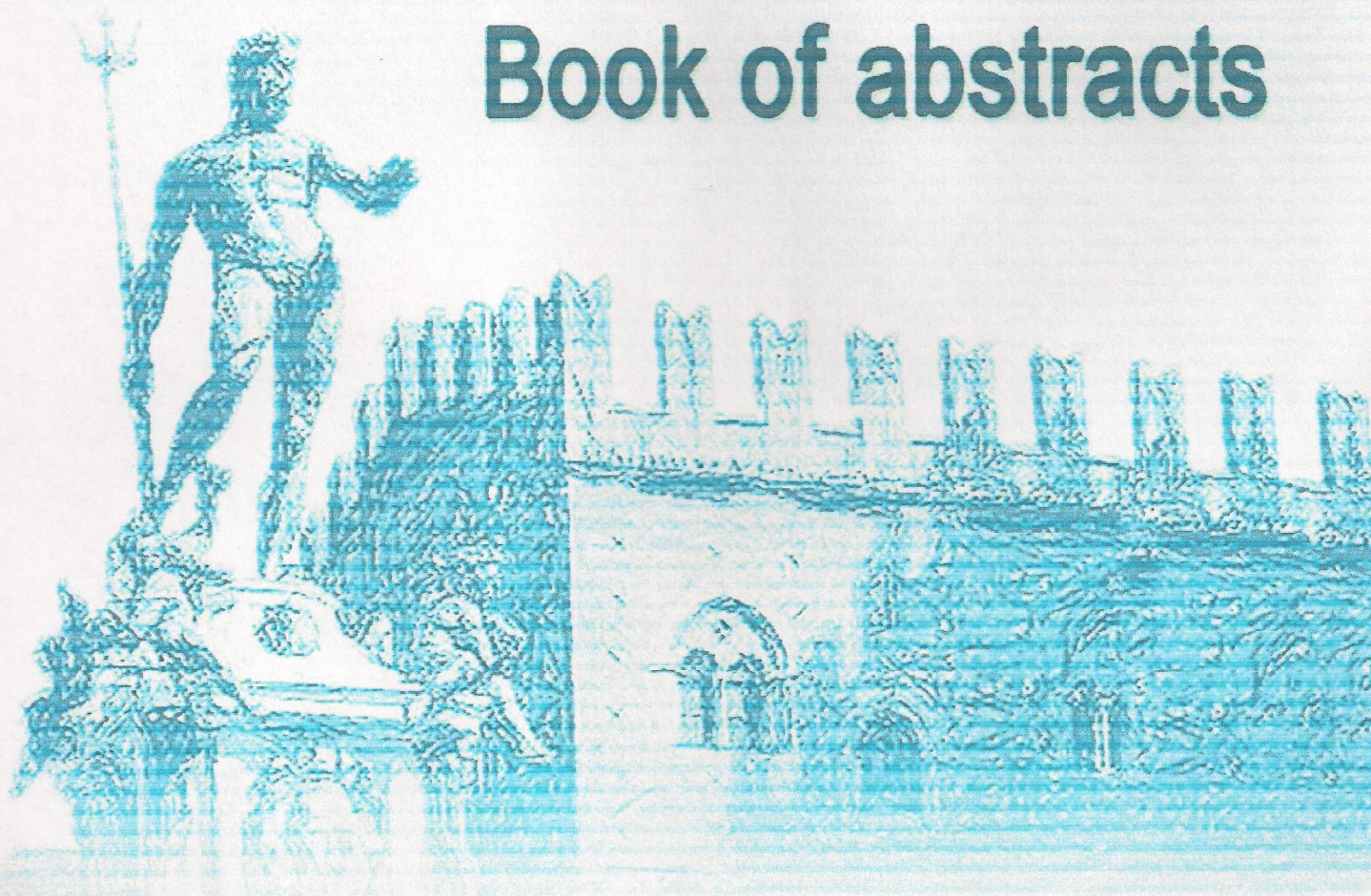
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DISCRIMINATION OF OLIVE TREE VARIETIES INFECTED BY *XYLELLA FASTIDIOSA* USING VOLATILES BY HS-SPME-GC-MS COMBINED WITH MULTIVARIATE STATISTICAL ANALYSIS

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Xylella fastidiosa is a Gram-negative, plant-pathogenic bacterium that causes diseases in different plant species [1]. It is noted that the VOCs emitted by plants are a very complex mixture of several hundreds of components that play an important role in trophic relations in diverse ecosystems and provide important cues for insects in their search for hosts. Moreover, these compounds may work out as direct and indirect plant defense and to attract insects for pollination [2]. For this reason, HS-SPME-GC-MS technique was proposed to highlight VOCs composition differences between twigs coming from healthy and *Xf* infected olive trees. Four different fibers (PDMS, Carboxen-PDMS, DVB-Carboxen-PDMS, and PDMS-DVB StableFlex) were tested and GC-MS conditions were evaluated in order to optimize the number of VOCs detected by the proposed method. Finally, differences between samples healthy and *Xf* infected were evidenced by means of a chemometric analysis (PCA and ANOVA-test). More than one hundred different volatile compounds, comprising acids, esters, alcohols, methyl esters, other esters, aldehydes, hydrocarbons, terpene derivatives, amides, aromatics, furanes and ketones, were identified in the analyzed samples. PCA analysis has allowed to highlight differences between the two olive tree cultivars and the important discrimination among healthy and *Xf* infected trees. PCA and ANOVA have also evidenced the involvement in the defensive mechanism paths of the olive tree and/or in the infective action of *Xf* through the formation of new methyl esters, a decrease of ketones and aldehydes and an increase of hydrocarbons that can be considered disease markers. The proposed approach has been used to set-up a quick, easy and solvent-free screening method to evaluate the presence of *Xf* in olive trees.

[1] H.A. Arcuri, F. Canduri, J.H. Pereira, et al., Molecular models for shikimate pathway enzymes of *Xylella fastidiosa*. *Biochem. Biophys. Res. Commun.* 320 (2004) 979–991.

[2] E. Ranieri, S. Ruschioni, P. Riolo, et al., Fine structure of antennal sensilla of the spittlebug *Philaenus spumarius* L. (Insecta: Hemiptera: Aphrophoridae). I. Chemoreceptors and thermo/hygroreceptors. *Arthropod Struct. Dev.* 45 (2016) 432–439.

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