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OF SUGAR BEET RESEARCH

ABSTRACTS OF PAPERS

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**Innovation: our driver for a profitable
and ecologically balanced
sugar beet production**

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Session 3: Managing insect-related threats

3.1 BOJAN DUDUK¹, ANDREA KOSOVAC¹, JELENA STEPANOVIĆ¹, EMIL REKANOVIĆ¹, ŽIVKO ĆURČIĆ², NINA VUČKOVIĆ³, NATAŠA DUDUK³ AND IVANA VICO³

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PHYTOPLASMAS INFECTING SUGAR BEET IN CENTRAL EUROPE

In Europe, the cultivation of sugar beet faces significant challenges due to the emergence of 'basses richesses' syndrome (SBR) and rubbery taproot disease (RTD) which are associated with fastidious bacteria, '*Candidatus Arsenophonus phytopathogenicus*' and '*Candidatus Phytoplasma solani*,' respectively.

A comprehensive study conducted from 2018 to 2022 aimed to elucidate the prevalence and distribution of these pathogens in sugar beet in central Europe, focusing on the Pannonian Plain (particularly Serbia and Slovakia where RTD has been present in epidemic scales) and Germany. Our investigations of sugar beet revealed that '*Ca. P. solani*' was the highly predominant fastidious bacterium found in the Pannonian Plain, while both '*Ca. A. phytopathogenicus*' and '*Ca. P. solani*' related phytoplasmas coexist in Germany. Furthermore, we identified *Reptalus quinquecostatus* as the vector responsible for transmission of the epidemic strain of '*Ca. P. solani*,' thus contributing to the epidemic occurrence of RTD. Notably, RTD-infected sugar beet exhibited increased susceptibility to charcoal root rot (*Macrophomina phaseolina*), compounding the losses associated with the phytoplasma infection alone. A phytoplasma strain related to '*Ca. P. solani*' predominated in Saxony-Anhalt (Germany) compared to '*Ca. A. phytopathogenicus*'. Moreover, the phytoplasma strain was classified as a novel subgroup designated as 16SrXII-P and exhibited significant genetic divergence from the reference and all other reported '*Ca. P. solani*' strains, including the ones from western Germany. Examination of sugar beet samples from previous years, confirmed the presence of the 16SrXII-P phytoplasma strain in sugar beet as early as 2020, with additional occurrences in Bavaria in southern Germany. Furthermore, 16S rDNA analysis of '*Ca. A. phytopathogenicus*' strains in Saxony-Anhalt showed them to be genetically identical to strains found in sugar beet in other regions of Germany and France, as well as a strain isolated from potatoes in Germany. Overall, our study underscores the importance of comprehensively understanding phytoplasma infections in sugar beet across Europe.