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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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**TRANSMISSION RISKS OF BEET YELLOWS VIRUS BY *MYZUS PERSICAE*
AND *APHIS FABAE* APHIDS IN DIVERSE EXPERIMENTAL CONDITIONS**

Sugar beet yields are negatively affected by the economically significant Beet yellows virus (BYV). For the past 30 years, effective control of BYV relied on neonicotinoid insecticides. However, the European Union's ban on outdoor use of these insecticides since 2018, driven by concerns over biodiversity and human health, led to widespread losses in the sugar beet industry due to BYV outbreaks. The main vectors of this virus are the green peach aphid (*Myzus persicae*) and the black bean aphid (*Aphis fabae*). Understanding the virus-vector relationship is crucial for developing new control methods. To address this, our study investigates viral transmission efficiency in sugar beet plants based on aphid density, species, and morphs (winged/apterous) in laboratory, greenhouse, and field conditions. Laboratory experiments were based on the virus transmission from an infected plant to a vector and from a vector to a healthy plant, while greenhouse experiments observed viral transmission changes when both vector species coexisted on the same infected plants simultaneously (i.e. by analogy to the same patch in the fields). Field experiments examined whether the first flying aphids that arrived in the fields after seed germination were viruliferous. In the laboratory experiment, it was shown that the best vector of BYV at low density was the winged *M. persicae* with a 25% of transmission probability with only three aphids present. In the greenhouse experiment, a significantly higher transmission probability was observed when both vector species were present at the same time at the same patch. Collecting this data provides valuable insights into how aphid species, density, and morphs affect the transmission of the virus, setting a solid foundation for future studies and the discovery of new pest control methods.