Managing postharvest disease in sugar beet by predictive approaches

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INTRODUCTION

Sugar beets are the main source of sugar in temperate regions around the globe. Due to extended campaign durations, sugar beets are stored for an average of 45-60 days after harvest. Microbial degradation during this time decreases the sugar content substantially. To identify disease induced microbiome changes in the field and during storage signatures in the microbiome of beets were studied. Using a barcoded amplicon sequencing approach the bacterial and fungal microbiome of healthy sugar beets in the field as well as in storage was accessed and compared to the microbiome of decaying sugar beets.

RESULTS

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microbiome. Different health status as well as sampling site were found to explain the most variance between the samples.



#### status were observed.



Gradual sugar loss during storage (B) was associated with increase in disease indicating taxonomic groups (A).



Micrographs showed bacterial and colonization fungal the sugar beet on surface.

Using bioinformatic tools the microbiome transfer from the field to storage was The tracked. decaying healthy or microbiome found in the beet clamp was shown to originate in the health of the field.



- Sugar beet rot on the field and during storage is accompanied by a change in microbial diversity as well as abundance
- Shifts in the bacterial and fungal community are analogous in field and clamp samples
- Microbiome traces can be transmitted from the fields to the clamps
- Changes in the prevalence of certain taxonomic groups could be used as early indicators for decay



[1] Kusstatscher, P., Zachow, C., Harms, K., Maier, J., Eigner, H., Berg, G., & Cernava, T. (2019). Microbiome-driven identification of microbial indicators for postharvest diseases of sugar beets. Microbiome, 7(1), 1-12.

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[2] Kusstatscher, P., Cernava, T., Harms, K., Maier, J., Eigner, H., Berg, G., & Zachow, C. (2019). Disease incidence in sugar beet fields is correlated with microbial diversity and distinct biological markers. Phytobiomes Journal, 3(1), 22-30.

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### INNOVATIONS FROM NATURE

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