

MATCHING MAIZE AND SOIL MICROBIOME TO BOOST SEED YIELD AND QUALITY

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Conventional agriculture is facing increasing public criticism for both the environmental impact of high-input production systems and concerns about food safety. Studies on the root microbiota as a factor influencing plant growth and health are constantly revealing new aspects of the role that microorganisms play in current and future agriculture.

In the frame of M&M project – Matching Maize and soil microbiome ... a multi locational trial was set up involving 4 corn genotypes and 20 sites across Northern Italy. During 2020 growing season, samples of bare soil and rhizosphere soil were collected and soil microbiota was characterized by BiomeMakers for ITS and 16S diversity. The analysis of microbial diversity allowed to highlight differences in microbiota as related to production macro-areas and yield results. While the core microbiome was very similar in all the locations, differences in field productivity were likely driven by minoritarian taxa.

Yield predictive models were created, considering different variables and their combinations: while the genotype and the environment explained 73.9% of yield variability, the rhizosphere microbiota was able to explain alone 90.3% of it (98% when combined to genotype and environmental parameters).

This highlighted the role of the soil microbiota in the successful production of maize seed and allowed to draft strategies to improve the reliability and sustainability of seed production through a more accurate field selection, a GxE optimization and more detailed studies on the role that single taxa can play on field results.