

## NITROGEN FIXATION IN A LANDRACE OF MAIZE IS SUPPORTED BY A MUCILAGE-ASSOCIATED DIAZOTROPHIC MICROBIOTA

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Plants are associated with a complex microbiota that contributes to nutrient acquisition, plant growth, and plant defense. Nitrogen-fixing microbial associations are well characterized in legumes but are largely absent from cereals, including maize. We studied an indigenous landrace of maize grown in nitrogen depleted soils in the Sierra Mixe region of Oaxaca, Mexico. This landrace is characterized by extensive development of aerial roots that secrete a carbohydrate-rich mucilage. Analysis of the mucilage microbiota indicated that it was enriched in taxa for which many known species are diazotrophic; was enriched for homologs of genes encoding nitrogenase subunits; and harbored active nitrogenase activity as assessed by acetylene reduction and <sup>15</sup>N<sub>2</sub> incorporation assays. Field experiments in Sierra Mixe using <sup>15</sup>N natural abundance or <sup>15</sup>N-enrichment assessments over 5 years indicated that atmospheric nitrogen fixation contributed 30 to 82% of the nitrogen nutrition of Sierra Mixe maize.

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