

## **Beneficial effects of naked amoebae (*Acanthamoeba castellanii*) on plant growth, nitrogen uptake and carbon assimilation varies with maize (*Zea mays*) cultivar**

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Nitrogen (N) limits plant growth in most terrestrial ecosystems. After mineralization, plant residues form a major source of N for plants growth. Plants invest significant amounts of photosynthates into the rhizosphere that enhance mineralization capacity of N by plant species specific microbial communities. Protozoa foster plant N uptake by re-mobilizing N from bacterial biomass ('microbial loop' in soil).

To evaluate whether cultivars of plant species differentially affect the functioning of the 'microbial loop', a microcosm experiment was carried out with three cultivars (cv) of maize (*Zea mays*; cv MB862, cv Bangui and cv PR39T45) and the naked amoebae *Acanthamoeba castellanii*. Plant biomass and stable isotopes (<sup>15</sup>N) were used to determine plant growth and N uptake from plant residues in soil. Photosynthesis was assessed by measurements of net CO<sub>2</sub> assimilation rates.

Growth, N uptake and CO<sub>2</sub> assimilation in the presence of naked amoebae varied among the investigated maize cultivars. Generally, MB862 was not affected by the presence of naked amoebae, whereas total shoot <sup>15</sup>N uptake was increased by 30% in Pr39T45. Bangui responded the strongest to naked amoebae with shoot biomass and total mass of <sup>15</sup>N in roots being increased by 40%. Further, Bangui almost doubled its net CO<sub>2</sub> assimilation rate in presence of naked amoebae.

The results suggest that plant-protozoa interactions strongly depend on plant cultivar. Therefore, cultivar specific plant-microbial interactions in the rhizosphere need to be considered to improve breeding strategies aiming to enhance N uptake of crops.