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Stimulative effect of the fungal biocontrol agent *Fusarium oxysporum* f.sp. *Striga* on abundance of nitrifying prokaryotes in a maize rhizosphere

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The integration of resistant crop varieties and *Fusarium oxysporum* f.sp. *strigae* (Foxy-2) strains as biological control agent (BCA) has shown to be an effective control of the weed *Striga hermonthica* which is parasitic to several cereals (e.g., maize) cultivated in Sub-Saharan Africa. Most studies have examined the efficacy of the BCA and its interactions with host crops, while overlooking the interplay among key microorganisms in the soil nitrogen (N) cycle. Hence, we postulated that both Foxy-2 and *Striga* pose threats to the indigenous plant root-associated microbial communities involved in N cycling through direct or indirect competition for nutrients and that the application of high quality organic residues would compensate these effects. The primary objective of this study was thus to assess the potential impact of Foxy-2 on indigenous nitrifying prokaryotes in maize rhizosphere cultivated on two distinct soils (sandy Ferric Alisol versus clayey Humic Nitisol) obtained from Machanga and Embu, respectively, in central Kenya. These soils were treated with or without Foxy-2 and *Striga*; and in combination with high quality (i.e. CN ratio; 13, lignins, 8.9 % and polyphenols, 1.7 %) organic residues (i.e., *Tithonia diversifolia*) as N source. Using quantitative polymerase chain reaction (qPCR), we followed at three pre-defined sampling dates (14, 28 and 42 days after planting) the responses of ammonia-oxidizing archaea (AOA) and bacteria (AOB), total bacteria and archaea in four treatments of a rhizobox experiment: (i) Foxy-2 plus *Striga* (F+S), (ii) *Striga* only (C+S), (iii) Foxy-2 plus *Striga* plus *Tithonia diversifolia* residues (F+S+T), and (iv) a non-treated control (C). Overall, the treatment effects on soil microbial populations were, in comparison to the clayey Embu soil, more pronounced in the sandy Machanga soil. Contrary to our expectations, we observed a distinct stimulative, but no resource competition effect of Foxy-2 on the abundance of AOA, as well as total archaeal and bacterial communities. AOB only showed significant increases in the Machanga soil when organic residues were added. Furthermore, there were transient detectable significant increases in total archaea and AOA due to *Striga* inoculation which also varied with the soil. The variation in treatment effects in the two soils was highly linked to the differences in soil properties such as dissolved organic carbon and soil pH which showed significant ($P<0.05$) correlations with all measured genes in the Machanga soils and total bacteria in the Embu soils. It was concluded that Foxy-2 did not pose a negative effect on the studied genes, but the underlying mechanisms for this major finding are subject for further research. The presented results were, however, established under rhizobox growth chambers and therefore field studies in contrasting agro-ecological zones are recommended to rule out restricted conditions, since antagonistic *Fusarium* are genetically stable and are able to survive long in foreign environments.