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## Effects of Contrasting Soil Types, Organic Fertilisation and *Striga* Presence on the Abundance of the Biocontrol Agent *Fusarium oxysporum* F.sp. *strigae* in Soils

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### Abstract

The parasitic weed species *Striga hermonthica* is one of the major constraints to cereal production in sub-Saharan Africa affecting the livelihood of about 100 million people. *Striga* lives parasitically on cereal crops such as millet, sorghum, maize, rice and sugar cane where it can lead to up to 100% crop loss in the field. The soil-borne biocontrol agent (BCA) *Fusarium oxysporum* f.sp. *strigae* (acronym: Foxy 2) has shown superior suppression ability of all growing stages of the weed *Striga* and seems to be a promising control tool for the African farmers. For the wide spread application in the field it is necessary to assess the control stability and therefore the persistence of the BCA under contrasting environmental conditions to investigate necessary re-inoculation times. Therefore a molecular detection tool based on quantitative polymerase chain reaction (qPCR) was developed to specifically quantify Foxy 2 in soil samples. In the presented study, a rhizobox experiment was performed with a *Striga* tolerant maize variety under controlled conditions in a climate chamber. Since the persistence of Foxy 2 can vary under different soil conditions and with presence or absence of the weed *Striga* we have included two contrasting tropical soil types, organic fertilisation with *Tithonia diversifolia* and *Striga* presence and absence in the experimental design. Foxy 2 was introduced via seed coating of the maize seed with  $1.15 \cdot 10^5$  colony forming units per seed. Rhizosphere soil samples were obtained 14, 28 and 42 days after planting and further analysed on the abundance of Foxy 2.

The rhizobox experiment clearly showed that soil type and organic fertilisation have significant effects on the abundance of Foxy 2. The propagation ability of the BCA was significant higher in the sandy soil type compared to the clayey soil. The organic fertilisation treatment was clearly promoting the abundance of Foxy 2 in both soils and can therefore increase the effectiveness of the BCA which is particularly important under non favoured soil conditions of the BCA to provide stable control ability against *Striga*.

**Keywords:** Biological control agents, *Fusarium oxysporum*, *Striga hermonthica*