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Enhancing *Striga* Management Using Pesta Granular Mycoherbicide Formulations: Synergy Between *Striga*- mycoherbicides and Nitrogen Fertiliser

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Abstract

Root parasitic weeds of the genus *Striga* constitute a major biotic constraint to staple food production in Africa, and consequently aggravate hunger and poverty. An integrated approach in which biocontrol represents an important component, appears to be the ideal strategy for reducing *Striga* infestation. Therefore, the synergistic effect between *Striga*-mycoherbicide *Fusarium oxysporum* (isolates Foxy 2 and PSM 197) and nitrogen fertiliser (urea) formulated into Pesta granules, in controlling *Striga* was investigated under glasshouse conditions. Pesta granules were made by encapsulating the inoculum of fungal isolates and urea in a matrix composed of durum wheat-flour, kaolin, and sucrose. Two g of each granular preparation were incorporated pre-planting per pot (4 kg soil) together with *Striga* seeds. An apparent synergistic effect between Foxy 2, PSM197 or of their mixtures and urea, encapsulated into Pesta granules, in controlling *Striga* was observed. All Pesta combinations totally inhibited or significantly reduced the emergence of *Striga* compared to the control, where a steep increase in *Striga* emergence was recorded. Even all the few emerged shoots in the pots treated with fungal mycoherbicide/urea combinations became diseased. None of the emerged plants reached flowering stage, whereas in the control treatment 13% of the *Striga* plant flowered. All Pesta preparations were very effective, with $\geq 92\%$ efficacy, indicating similar excellent potential of *Striga* control. When considering the improvement of the sorghum plants, however, the highest increase in the total biomass (85%) and in the panicle yield (40%) was achieved with preparation containing the mixture of Foxy2+PSM197+2g urea, confirming the synergistic effect of the fungal isolates and urea. However, the significant reduction in *Striga* emergence and flowering as a result of combining mycoherbicides and urea is an important feature to prevent further *Striga* distribution and infestation. These findings are highly relevant to the realisation of an integrated *Striga* control approach adoptable and applicable by subsistence farmers in Africa.

Keywords: *Fusarium oxysporum*, Mycoherbicide, parasitic Weed, biological control, *Striga hermonthica*