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Progress on *Striga* Mycoherbicide Research: Time for Scaling-Up?

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Abstract

Striga spp. are presenting severe constraints to cereal and legume production in semi-arid regions of Sub-Saharan Africa. An integrated approach to *Striga* management is required for which biocontrol represents a crucial component. *Fusarium oxysporum* f.sp. *strigae* (isolates Foxy 2 & PSM197) are virulent and potential biocontrol agents against *S. hermonthica*. Extensive research aiming at facilitating and enhancing their field application has been carried out since the last decade. In terms of safety, the isolates are highly host specific to the genus *Striga* only, and do not produce any mycotoxins that present health risks, and therefore their use pose no threat to humans or mammals. Genetic characterisation of these isolates has shown that these isolates are similar and having unique DNA sequences that enabled them to be classified as a new *forma specialis strigae*, which could ensure their bio-safety and thus greatly improve the acceptance of their use as mycoherbicides. Massive production of inoculum of these isolates was optimised based on simple, and low cost methods using locally available agricultural by-products. For practical use, the isolates were developed into Pesta granular formulation or delivered as seed treatment technology. Both delivery technologies showed compatibility and great potential and efficacy in controlling *Striga* under both controlled and field conditions, as well as maintaining excellent shelf-life after one year of storage that would be sufficient for their use under practical conditions of storage, handling and delivery. Integration of these mycoherbicidal products (granular and seed coating) showed synergy and enhanced field efficacy with *Striga*-resistant sorghum and maize cultivars, some co-coated fungicides, and demonstrated excellent control efficacy of *Striga* and improved crop performance in West Africa. Thus, these isolates are fulfilling all necessary requirements for being potential mycoherbicide candidates for scaling up to support and enhance the existing *Striga* control measures at farm level in Sub-Saharan Africa. Strategies about how to utilise these progresses to formulate successful integrated *Striga* control methods adoptable and applicable by subsistence farmers will be proposed.

Keywords: Bio-safety, fungicides, *Fusarium oxysporum*, integrated control, weed biological control, pesta, seed coating, shelf-life

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