



Tropentag, October 9-11, 2007, Witzenhausen

“Utilisation of diversity in land use systems:
Sustainable and organic approaches to meet human needs”

“Pesta” and Alginate Delivery Systems of *Fusarium* spp. for Biological Control of *Striga hermonthica* (Del.) Benth. under Sudanese Field Conditions

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Abstract

The parasitic weed *Striga hermonthica* is the main biotic factor affecting sorghum, maize and millet production in the Semi-Arid Tropics. Since there is no simple, fast and inexpensive solution to the *Striga* problem, biological control with phytopathogenic fungi could be a beneficial alternative within an integrated control approach. Field experiments were conducted at Gezira, Sudan in two consecutive seasons (2003/2004), to study the efficacy of two biological agents (*Fusarium nygamai* (FN) and *Fusarium* sp. “Abuharaz” (FA)) formulated in wheat flour-kaolin granules (made by mixing fungal inoculum with wheat flour (semolia), sucrose and kaolin to form granules using a hand-operated “Pesta machine”) on *Striga* infestation and to determine the dose needed for effective weed control. Furthermore, an alginate formulation was tested as alternative delivery system. In the first season the highest control efficacy was achieved by applying FA in “Pesta” granules at 1.5 g planting⁻¹ hole, which reduced the total number of parasite shoots by 82 % and the number of healthy *Striga* shoots by 88 % compared to the untreated control. As a consequence, sorghum biomass and sorghum 100-seed weight were increased by 88 % and 110 %, respectively, compared to the untreated control. FN and the combination of the fungal isolates were slightly less efficient in controlling the parasites. During the second season all preparations applied at 1.5 g planting⁻¹ hole showed a lower efficacy in reducing *Striga* total number compared to the first season. Nevertheless, FA formulated in “Pesta” or alginate pellets caused disease in 74 and 80 % of the *Striga* plants, respectively, and consequently improved sorghum performance. Both formulations proved to be easy delivery systems for the tested fungal isolates, however, from the economic point of view, the “Pesta” formulation is possibly more appropriate since it is cheaper and easy to prepare. Further research should focus on increasing and stabilising the efficacy of the bioagent under field conditions.

Keywords: Formulation, *Fusarium*, mycoherbicide, parasitic weeds, *Striga hermonthica*