

Extended Abstract

Investigating the Sporulation of *Metarhizium anisopliae* Formulated in Calcium Alginate in Soil [†]

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Wireworms have the potential to cause significant damage to sweetpotato, particularly late in the season. Whilst several insecticides are registered for use under minor permits, grower concern over the development of resistance has highlighted the need for alternative chemistry and management options. Entomopathogenic fungi like *Metarhizium anisopliae* have been shown to cause wireworm mortality in both laboratory and field conditions. Maintaining the abundance and persistence (i.e., resporulation) of fungi in soil is important for insect control; however, survivability declines in soils when the fungi is inundatively applied because the growth of fungi is limited and can also be parasitised or inhibited by other soil microbes. In this study, to mitigate this fungistasis, conidia of *M. anisopliae* were encapsulated in calcium-alginate granules with nutrients for the fungi in the form of corn starch or autoclaved baker's yeast or combination thereof. Combined corn starch and baker's yeast yielded the highest sporulation (granule denoted as CAG_{Ma+Cs+By}). This study further investigated the infectivity of sporulated CAG_{Ma+Cs+By} for mealworms, and resporulation of CAG_{Ma+Cs+By} in field-collected soils that were either sterilised or not. Sporulated CAG_{Ma+Cs+By} caused >90 % mealworm mortalities over 7 days bioassay. After 4 weeks incubation, resporulation of CAG_{Ma+Cs+By} in sterile soil was significantly greater (P value > 0.05) compared to that observed in non-sterile soils (Figure 1). Further work is required to identify other additives that could be incorporated into granules to decrease the effect of fungistasis, to encourage entomopathogenic fungi to better establish in soil and to enhance the biological control of wireworm in sweetpotato.

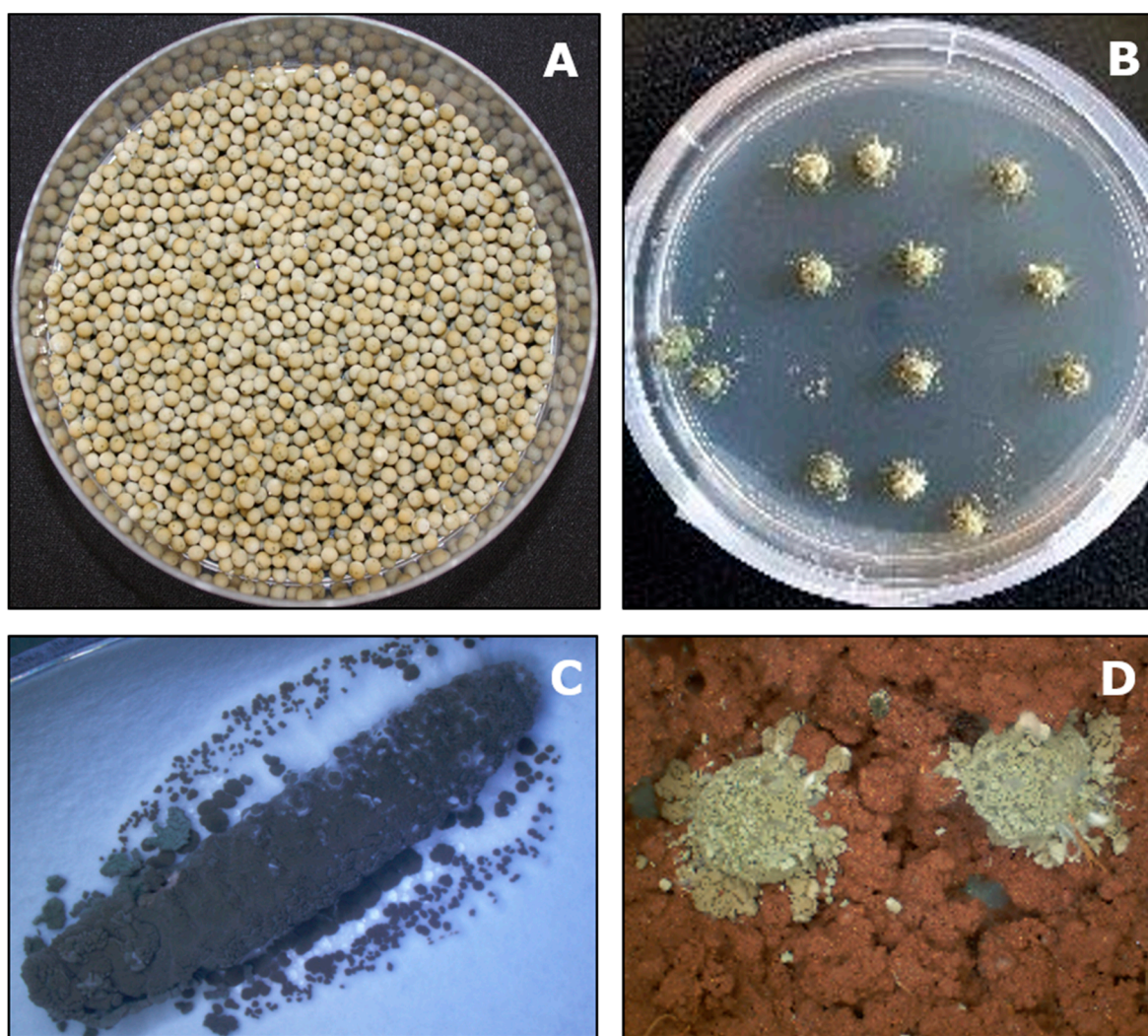


Figure 1. *Metarhizium anisopliae* formulated in calcium alginate granules (CAG_{Ma+Cs+By}) for soil insect control (A); the fungal granule CAG_{Ma+Cs+By} containing corn starch and autoclaved baker's yeast as the food source for *M. anisopliae* produced the optimal resporulation (B); a conidiated cadaver (mealworm) caused by the infection of resporulated CAG_{Ma+Cs+By} (C); and CAG_{Ma+Cs+By} resporulated in pasteurised soil following one month of incubation (D). (Photos source: Sudhan Shah).

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