Pathogenicity of the entomopathogenic fungus *Lecanicillium muscarium* to adults of fruit fly *Ceratitis capitata*

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Introduction

The fruit fly ***Ceratits capitata*** (Fig 1) is the most economically important pest of fruits in tropical and subtropical regions of the world (Allowed, 1997). Because of its wide distribution over the world, its ability to tolerate cooler climates is better than most of other species of fruit flies. In this laboratory study, the objective was to determine the effects ***L. muscarium*** on mortality of the adults of ***C.capitata*** under laboratory conditions and possible use of the fungus for fly control. The length of time required for the Medfly to complete its life cycle under tropical conditions is 21-30 days (Fig 2).

Fig 1 Adult of *Ceratitis capitata*

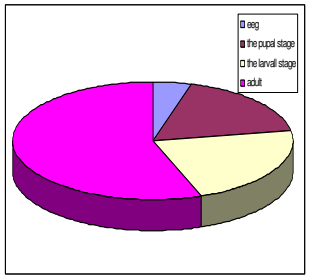

Fig 2 length of time required for the medfly to complete is life cycle by T (25, 26.1 ℃), (Weems, 1962)

Materials and methods

Pupae were obtained as larvae from infested guava fruits collected in Syria in September 2006. Round plastic containers (10 cm diam. × 12 cm high) were filled with 0,5 l soil (10% humid) (Fig 3). Then 25 pupae were spread uniformly on the bottom and covered with 2 to 3 cm layer of moist soil. After that fungal spores were applied to soil surface using a dash bottle. A glass disk used to seal the container to retaining soil moisture. There were 4 replicates of the control and each treatment (table 1). In all variants, adults were collected every 24 h until emergency finished. Adults were transferred to cages and supplied with water and dry 20% yeast extract-80% sucrose. The number of flies that died in the containers were recorded every 1 d up to 14 d. Died flies were disinfected in 70% ethanol, and supplementary in 5% NaOCl and then placed on water agar in Petri dishes by incubation at 20 ℃.

Fig 3 Round plastic containers (10 cm diam × 12 cm high)

Table 1 Surface- Application method in the laboratory experiment testing effects of ***L. muscarium*** of adult ***Ceratitis capitata***

Treatm.	Application method	Spore /ml	volume of suspension	spores/cm²	Soil moisture
1	Surface	2.1×10^{9}	4 ml	8.84×10^{7}	10%
2	Surface	2.1×10^{8}	4 ml	8.84×10^{6}	10%
3	Surface	2.1×10^{7}	4 ml	8.84×10^{5}	10%

Fig 3 Initiation of Infections of C.capitata by entomopathogenic fungus ***L.muscarium***

Fig 4 Infected fly of *C .capitata* by entomopathogenic fungus ***L.muscarium***

Results

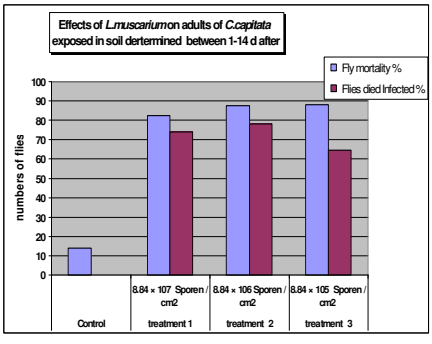

Fig 5 Effects of *L. muscarium* on adults of *C. capitata* exposed as tenerals in soil with 10% moisture (14 d after emergency)

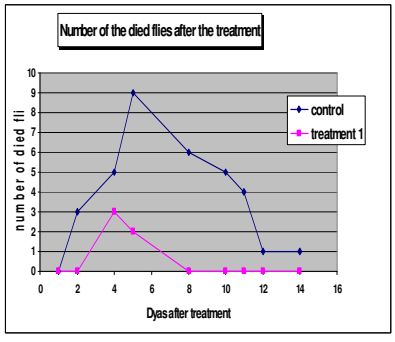

Fig 6 Daily number of died flies of ***Ceratitis capitata*** adults as tenerals in soil (8.84×10^{7} Spore / cm²; Spore suspension on soil surface)

- There was greater mortality in treated with fungal spores than control flies.

- Flies were infected at a significant higher level then in control when these exposed to ***L. muscarium*** under laboratory conditions.

- There was no effect of ***L. muscarium*** on emergency of adult.

- Most flies died 2 to 6 d past emergency.

Conclusions

There was a contact between the emerging flies and the fungal spores during the time of the emergency, the spores adhered to the body of the fly and caused the infection. The adults were highly susceptible to ***Lecanicillium muscarium*** at 3 spore concentrations and usually not did cause death until 3 d after exposure . The high mortality of the flies was in consequence of infection by ***L. muscarium***. This study indicate that ***L.muscarrium*** can cause mortality of adult stage of ***C.capitata*** under laboratory conditions,The teneral adult should be targeted for control because high amounts of fungal spores can be brought into contact with flies in soil more easily than to the those in the trees. The pathogenicity of ***L.musccarium*** to adults has been demonstrated, the next step is to examine if the infection of fruit flies is successfully under field conditions. The use of fungal pathogens could therefore be an important IPM component for the management of fruit flies species in the orchards.

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