

Susceptibility of *Ceratitis capitata* Wiedemann (Diptera : Tephritidae) to Entomopathogenic Fungi

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INTRODUCTION

The fruit flies are the most serious pests of fruits and vegetables in the tropical and subtropical regions of the world. They have many generations per year (up to 8) in Syria and attacks a large variety of fruits. Since several years, in citrus orchards of Syria, the control methods against the fruit flies make use of integrated pest management (IPM) and alternative methods more and more. The objective of this study was, to evaluate the virulence of two entomopathogenic fungi *Beauveria bassiana* and *Paecilomyces fumosoroseus* on the adults of Mediterranean fruit fly under laboratory conditions.



Fig. 1 Adult of Mediterranean fruit fly *Ceratitiss capitata* (Copyright © 2005 Stephanie Hart)

MATERIALS AND METHODS

The adults of *C. capitata* were obtained from the laboratory breeding (25°C, 60 % RH and 16:8 (L:D). The flies were carefully dipped for 10-15 seconds in 10 ml of conidial suspension with four concentrations (3×10^4 , 3×10^5 , 3×10^6 and 3×10^7 conidia/ml) of *B. bassiana* and *P. fumosoroseus* or water for control respectively. After that, flies were transferred to plastic cages with diet and water (Fig. 2). The cages were incubated at 25°C. The dead flies were collected at intervals of 24 h for 20 days, sterilized (0.5% NaOCl for 2 sec., 70% ethanol for 2-3 sec) and placed on moist filter paper in petri dishes and incubated at 20°C in darkness. After 2 days the number of moulded flies was counted.



Fig. 2 Treated flies in plastic cage with water and food

RESULTS

1

Flies were very susceptible against both entomopathogenic fungi. Mycelium emerged likewise through the wing and legs bases, head and membranous regions of the abdomen (Fig.3).

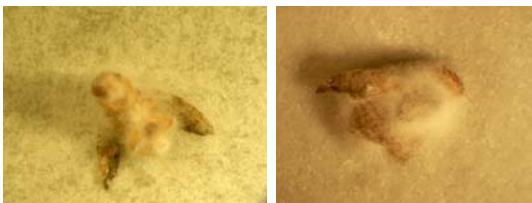


Fig. 3 Moulded flies of *C. capitata* left by *B. bassiana*, right by *P. fumosoroseus*

2

Adults of *C. capitata* were more susceptible to *B. bassiana* than *P. fumosoroseus* also in higher concentrations (Fig. 4).

3

Both entomopathogenic fungi showed the highest mortality at 3×10^7 conidia/ml. Concentrations of 3×10^4 , 3×10^5 conidia/ml were inactive (Fig. 4).

4

Dead flies moulded easily. The mouldiness was more intensive in the two higher concentrations (Fig. 5).

Table 1 Percentage of mortality, efficiency factor, infected flies of *C. capitata* and LT₅₀ 16 days after application of *B. bassiana* and *P. fumosoroseus* (25°C, 60% RH and 16:8 L:D)

Entomopathogenic fungi	Efficiency factor %	Mortality %	Infected flies %	LT ₅₀
Control	-	7,5	-	-
<i>B. bassiana</i> 10 ⁷	100	100	77,5	5,26
<i>B. bassiana</i> 10 ⁶	70,27	82,5	72,5	9,43
<i>B. bassiana</i> 10 ⁵	18,91	25	17,5	-
<i>B. bassiana</i> 10 ⁴	10,81	17,5	7,5	-
<i>P. fumosoroseus</i> 10 ⁷	67,56	70	52,5	12
<i>P. fumosoroseus</i> 10 ⁶	59,45	62,5	52,5	12
<i>P. fumosoroseus</i> 10 ⁵	24,32	30	15	-
<i>P. fumosoroseus</i> 10 ⁴	0	7,5	5	-

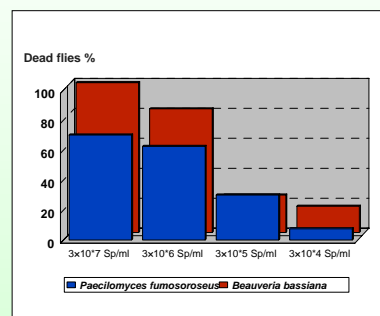


Fig. 4 Dead flies (%) of *C. capitata* after application of *B. bassiana* and *P. fumosoroseus* (25°C, 60% RH and 16:8 L:D)

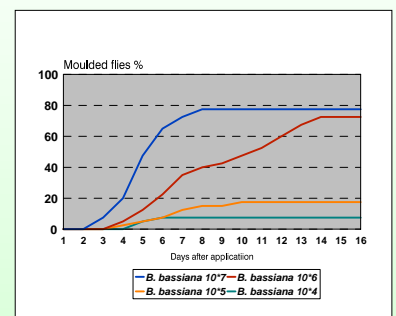


Fig.5 Moulded flies (%) of *C. capitata* adults up to 16 days after application of *B. bassiana* (25°C, 60% RH and 16:8 L:D)

CONCLUSION

Selection of entomopathogenic fungi and its strains is one of the most important steps in a microbial control program. In our experiments *B. bassiana* was more virulent to *C. capitata* than to *P. fumosoroseus*. In case of these entomopathogenic fungi we suppose, that the size and form of spores is responsible for the result. The conidial spores of *B. bassiana* are round and small, consequently they could achieve successfully to adhere on the fly integument. While the longish spores of *P. fumosoroseus* were adhered on the fly hair and could not contact the integument to cause the infection.

The effective mortality of flies at 3×10^7 conidia/ml of *B. bassiana* based on the high number of spores on the body of flies. Mortality was ineffective at lower concentrations of both entomopathogenic fungi. In these case we suppose, that the number of adhered spores on the flies were too little to cause a high mortality. The moulding of flies occurred rapidly and easily at high concentrations after a short time. These indicates, that the most of died flies were infected with the entomopathogenic fungi. In further experiments *B. bassiana* should be examined, if the infection of fruit flies is successfully under field conditions too.