



Efficacy of the native entomopathogenic fungal isolates with different inoculation methods

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ABSTRACT

The fungal isolates collected from Karaikal were tested against seven insect pests using different inoculation methods *viz.*, spraying, crawling and dipping. Dipping method was found to be highly effective (82.50 per cent) to coccinellids followed by spraying and crawling methods (48.75 and 13.75 per cent). Larval mortality of spotted pod borer in pulses is more with spraying method (85.00 per cent). Isolate of *Fusarium moniliforme* on Green Leaf Hopper (GLH) recorded 90 per cent mortality with spraying method. Isolate of *F. pallidoroseum* against third instar of rice leaf folder caused 82.50 per cent mortality in spraying method followed by crawling (62.5) and dipping methods (42.5). Among the three methods, spraying method was considered to be superior. Isolate of *F. pallidoroseum* against third instar larvae of *E. vittella* recorded 50.00, 40.00 and 90.00 per cent mortality with spraying, crawling and dipping methods respectively. In general spraying method was found to be superior.

Key words : Entomopathogenic fungi, pathogenicity, inoculation method

INTRODUCTION

Entomopathogenic fungus has received considerable attention by researchers for their potential for biological control of pests. Recently *Beauveria bassiana* have received a lot of attention (Meyling and Eilenberg, 2007). At present, many mycoinsecticides were available for the control of insect pests. Among numerous entomogenous fungi collected in Karaikal during 2007-2008 seven fungi were found to be highly pathogenic against various crop pests. For large scale study efficient method of inoculation is necessary. In this study three methods of inoculation *viz.*, spraying, crawling and dipping methods were studied and the results are reported.

MATERIALS AND METHODS

Fungi isolated from insect cadavers

All the mycoflora isolated from the cadavers were subjected to pathogenicity test. Adult insects / larvae were treated by spraying conidial suspension (10^7 spores / ml) of isolated fungi @ 5ml using an atomizer confined in mylar film cages. Treated larvae / adults were observed for the development of typical symptoms of mycosis. (Phadke and Rao, 1978). Among the tested fungi, seven fungi were found to be pathogenic. They are *Beauveria bassiana* to rice coccinellid isolate (BbMdKKL 2106), *B. bassiana* to black gram spotted pod borer isolate (BbMtKKL 2107), *Fusarium moniliforme* to rice green leaf

hopper (GLH) isolate (FmNvKKL 2124), *Fusarium pallidoroseum* to rice leaf folder isolate (FpCmKKL 1526), *F. pallidoroseum* to bhendi fruit borer isolate (FpEvKKL 2119), *Verticillium psalliotae* on rice brown plant hopper (BPH) isolate (VpNIKKL 2121) and *V. psalliotae* against rice skipper isolate (VpPmKKL 2120). The data were analysed using Panse and Sukhatme (1957) method.

RESULTS AND DISCUSSION

In the present study, fungal isolates were tested using different methods of inoculation *viz.*, spraying, crawling and dipping. The isolates of *B. bassiana*, *F. moniliforme*, *F. pallidoroseum*, and *V. psalliotae* were found to be highly pathogenic to the insects. Dipping method was found to be highly pathogenic to coccinellids followed by spraying and crawling. Quick mortality was achieved with dipping method. Similarly, *B. bassiana* against third instar of *M. testulais* (BbMtKKL2107) showed that larval mortality was significantly high in spraying method from these through dipping and crawling methods (Table 1).

Isolate of *F. moniliforme* on GLH (FmNvKKL2124) recorded 90.00 per cent mortality in the spraying method. Isolate of *F. pallidoroseum* (FpCmKKL1526) against third instar of *C. medinalis* caused 82.50 per cent mortality in spraying method followed by crawling and dipping methods. Among the three methods, spraying method was considered to be superior. Isolate of *F. pallidoroseum*

Table 1. Effect on different methods of inoculation of the entomopathogenic fungi on the mortality of insects under *in vitro* condition.

Methods of inoculation	BbMdKKL2106		BbMkKkL 2107		FmNvKkL 2124		FpCmKkL 1526		FpEvKkL 2119		VpNikKkL2121		VpPmKkL2120	
	Mortality rate (%)	Time taken (Days)	Mortality rate (%)	Time taken (Days)	Mortality rate (%)	Time taken (Days)	Mortality rate (%)	Time taken (Days)	Mortality rate (%)	Time taken (Days)	Mortality rate (%)	Time taken (Days)	Mortality rate (%)	Time taken (Days)
Spraying	48.75 (44.28) ^b	11	85.00 (73.55) ^a	7	90.00 (74.14) ^a	7	82.50 (65.47) ^a	4	50.00 (47.88) ^b	8	86.25 (71.25) ^a	6	87.50 (72.11) ^a	7
Crawling	13.75 (21.56) ^c	10	52.50 (46.44) ^b	9	15.00 (22.64) ^c	9	62.50 (53.08) ^{ab}	9	40.00 (38.95) ^b	10	15.00 (22.64) ^c	9	60.00 (50.83) ^b	8
Dipping	82.50 (68.50) ^a	7	62.50 (52.49) ^b	11	37.50 (37.63) ^b	9	42.50 (40.39) ^b	9	90.00 (76.72) ^a	5	55.00 (47.91) ^b	10	42.50 (40.61) ^b	8
Control	2.50 (6.46) ^d	10	12.50 (17.89) ^c	12	10.00 (15.57) ^c	10	2.50 (4.61) ^c	11	0.00 (0.00) ^c	12	6.25 (12.45) ^c	10	0.00 (0.00) ^c	9
CD	13.44	-	18.99	-	13.41	-	14.43	-	17.87	-	12.93	-	11.45	-
SE	4.46	-	6.30	-	4.45	-	4.79	-	6.90	-	4.29	-	4.45	-

Mean of four replications; Figures in parentheses are arc sine transformed values;

In a column mean followed by a common letter are not significantly different at (P = 0.05) 5 % level by DMRT

BbMdKkL2106 - *B. bassiana* coccinellid FpCmKkL 1526 - *F. pallidoroeseum* leaf folder VpNikKkL2121 - *V. psalliotae* BPH
 BbMkKkL 2107 - *B. bassiana* spotted pod borer FpEvKkL 2119 - *F. pallidoroeseum* bhendi fruit borer VpPmKkL2120 - *V. psalliotae* skipper
 FmNvKkL 2124 - *F. moniliforme* GLH

against third instar larvae of *E. vittella* (FpEvKkL2119) recorded 50.00, 40.00 and 90.00 per cent mortality with spraying, crawling and dipping methods respectively. This isolate proved that dipping method was found to be superior.

Isolate of *V. psalliotae* against third instar BPH nymphs (VpNikKkL2121) showed mortality in spraying, crawling and dipping methods as 86.25, 15.00 and 55.00 per cent respectively. Among the three methods, spraying method was considered to be superior followed by dipping and crawling methods. Isolate of *V. psalliotae* against third instar larvae of *Pelopidas mathias* (VpPmKkL2120) showed that spraying method was found to be highly pathogenic followed by crawling 60.00 and dipping 42.50 per cent and they were on par with each other. The spraying method was found to be very effective for GLH, BPH, leaf folder, skipper and spotted pod borer on pulses. On the contrary the different methods *viz.*, spraying, crawling and dipping methods were not found to be significant (Mathur *et al.*, 1966). Nayak and Srivastava (1978) noted that quick mortality was noticed in *Scirpophaga incertulas* and *Chilo auricilius* using crawling method over feeding method.

It is evident from the results that dipping method was very effective for coccinellid predator to *B. bassiana* (BbMdKkL 2106) isolate and *E. vittella* to *F. pallidoroeseum* (FpEvKkL 2119) isolate. This was in consonance with the earlier report that susceptibility of *C. septempunctata* to the different isolates of *B. bassiana* in cabbage by dipping method (Haseeb and Murad, 1997). They also reported that dosages of pathogen and the method of its application were important factors affecting the mortality rate in the field. Inoculating spore suspension of *B. bassiana* in red hairy caterpillar through larval dip method and observed mortality at fourth day and cent per cent mortality on tenth day (Veenakumari *et al.*, 2006). Recently Rama Devi *et al.* (2010) revealed that lepidopteran forests pests were effective against *Metarhizium* isolates using dipping method.

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